20-453

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

No. 332.

WILLIAM HAILES AND JOHN G. TREADWELL, ADMINISTRATOR OF ELLEN TREADWELL, DECEASED, APPELLANTS,

vs.

JASPER VAN WORMER, MICHAEL McGARVEY, ABRAHAM MANN, AND JOSEPH C. BARNES.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT OF NEW YORK.

FILED JANUARY 18, 1872.

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1 United States circuit court, northern district of New York.

WILLIAM HAILES AND ELLEN T. TREADWELL
vs.
JASPER VAN WORMER ET AL. } In equity.

Defendant's costs taxed as stipulated at $250.

CHARLES MASON, *Clerk.*

2 United States circuit court, northern district of New York.

WILLIAM HAILES AND ELLEN T. TREADWELL
vs.
JASPER VAN WORMER, MICHAEL MCGARVEY, Abram Mann, and Joseph C. Barnes. } In equity.

The plaintiffs in this cause, William Hailes and Ellen T. Treadwell, filed their bill of complaint, which is hereto annexed, on the 27th day of September, 1867, against the defendants, Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes. A subpœna was thereupon issued, requiring the defendants to appear and answer in said cause, and was returned duly served more than twenty days previous to the return day thereof. On the 4th day of November, 1867, the defendants appeared herein by J. C. McClure, esq.,
3 their solicitor, the time to answer having been extended by stipulation on the 8th day of January, 1868. The defendants filed their answer, which is hereto annexed, and the plaintiffs replied thereto on the 11th day of February, 1868.

Afterwards proofs were taken herein, and this cause was continued down to the June term, 1870, of this court, when the said cause came on to be heard, when the bill of complaint herein was dismissed with costs.

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5 In the circuit court of the United States, northern district of New York. In equity.

WILLIAM HAILES AND ELLEN T. TREADWELL
agt.
JASPER VAN WORMER, MICHAEL MCGARVEY, Abram Mann, and Joseph C. Barnes.

To the honorable the judges of said court:

Your orators, William Hailes and Ellen T. Treadwell, citizens of the United States, and residing and doing business in the city of Albany and State of New York, and within the said northern district of said State, do bring this their bill of complaint against the above-named Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes, residing and doing business in the city of Albany aforesaid, and thereupon your orators complaining show unto your honors,

That John G. Treadwell and William Hailes, of the said city of
6 Albany, were the original and first inventors of a certain new and useful improvement in coal-stoves, fully described in letters-patent next hereinafter mentioned, and which had not been known or used before their said invention, and which had not been at the time of their

application for a patent, as hereinafter mentioned, in public use or on sale with their consent or the consent of their assigns, or with their allowance, for more than two years prior to the application aforesaid.

That the said John G. Treadwell, being one of the original and first inventors of the improvement aforesaid, sold and assigned his interest, right, and title in and to the same, for a valuable consideration to him therefor paid, to Martin L. Mead, of the city of Albany aforesaid, which assignment was made in due and legal form, and was duly recorded in the records of the Patent-Office of the United States, according to the provisions of the statute in such cases made and provided, by means of which said assignment the said Martin L. Mead became and was the owner of one undivided half of said invention and improvement, and equally interested therein with the said William Hailes.

And your orators further show that the said John G. Treadwell and the said William Hailes, being the first and original inventors and discoverers of said improvement in stoves, and each of them being citizens of the United States, did, on the eleventh day of August, 1863, upon due application therefor, and by complying with all and singular the provisions of the acts of Congress in such cases made and provided, procure letters-patent of the United States, for said invention and improvement, in due form of law, under the seal of the Patent-Office of the United States, signed by the Secretary of the Interior, and countersigned by the Commissioner of Patents, bearing date the day and year last aforesaid, and marked number 39535, to be issued to the said Martin L. Mead and William Hailes, whereby there was granted and secured unto the said Martin L. Mead and William Hailes, their heirs, administrators, or assigns, for the term of seventeen years from the 11th day of August, 1863, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the specification annexed to the said letters-patent, as by said letters-patent or a duly authenticated copy thereof in court to be produced, will fully and at large appear.

7 And your orators further show to your honors, that afterwards to wit, on the second day of March, 1864, at Albany aforesaid the said Martin L. Mead, for a valuable consideration to him therefor paid, did, by an assignment in writing bearing date the day and year last above mentioned, sell, assign, transfer, and make over to your orator, Ellen T. Treadwell, all his right, title, and interest in and to the said letters-patent, and to the invention and improvement therein set forth and described; which said assignment was duly recorded in the records of the Patent-Office according to the provisions of the act of Congress in such cases made and provided, as by said assignment, or a duly authenticated copy thereof, and certificate of the recording thereof, in court to be produced, will fully and at large appear.

And your orators further show unto your honors, that the said John G. Treadwell and the said William Hailes were, and also are the original and first inventors of certain other improvements in stoves, which were both new and useful, and which are fully described in the specification attached to certain other letters-patent next hereinafter described, and which said improvements had not been known or used before the said invention, and which had not been, at the time of the application for said patent, as hereinafter mentioned, in public use or on sale with the consent or allowance of the said inventors or their assigns, for more than two years prior to their said application; and being the original and first inventors thereof, as aforesaid, and being citizens of the United States as aforesaid, the said John G. Treadwell and the said William

Hailes, on or about the 7th day of May, 1861, upon due application therefor, did procure letters-patent of the United States for said last-mentioned invention and improvement, in due form of law, under the seal of the Patent-Office of the United States, and signed by the Secretary of the Interior, and countersigned by the Commissioner of Patents, bearing date the day and year last aforesaid, to be granted to the said William Hailes and the said Ellen T. Treadwell, as assignees of the said John G. Treadwell and the said William Hailes, and which said last-mentioned letters-patent were duly, and according to the provisions of the act of Congress in such cases made and provided, surrendered by the said William Hailes and the said Ellen T. Treadwell to the said Patent-Office; and the same were then and there canceled, and new letters-patent were issued therefor to the said William Hailes and the said Ellen T. Treadwell, bearing date the 3d day of February,
8 1863, and marked Re-issue, No. 1397, whereby there was granted and secured to the said William Hailes and the said Ellen T. Treadwell, their heirs, administrators, and assigns, as the assignees of the interest of the said John G. Treadwell and William Hailes, for the term of seventeen years from and after the 7th day of May, 1861, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said last-mentioned invention and improvements, as by said re-issued letters-patent, or a duly-authenticated copy thereof, in court to be produced, will fully and at large appear.

And your orators further state that, in the surrender of the said letters-patent as aforesaid, bearing date the 7th day of May, 1861, and in filing their amended specification and description of the said invention and improvement in the Patent-Office of the United States, for the purpose of obtaining the re-issue as aforesaid, they in all respects complied with the requirements of the act of Congress in such cases made and provided, and that the said last-mentioned letters-patent were re-issued to your orators in due and legal form—a full description whereof, and of the rights secured to your orators thereby, will fully appear by reference to said re-issued letters-patent, which your orators will in court produce for the inspection of the court.

And your orators further represent that each of the aforesaid inventions and improvements, secured to your orators as aforesaid, are and have been of great utility and value, and that the said inventions have been, and each of them have been, employed by your orators, and by the former owners thereof, respectively, to their great benefit and advantage, and to the great benefit and advantage of the public, and that the public have generally acknowledged and acquiesced in the rights ot your orators, and your orators believe that they will receive and realize large gains and profits from the use and sale of said invention and improvements, if infringements by the said defendants and their confederates shall be prevented.

And your orators further show unto your honors that, after your orators became and were the owners of the letters-patent aforesaid, and ot the said re-issued letters-patent, as above set forth and described, said letters-patent were infringed by Henry Crandall and Silas White, stove-manufacturers, at the city of Albany aforesaid, in the said north-
9 ern district, by the manufacture and sale of stoves containing the inventions and improvements secured to your orators as aforesaid; whereupon your orators caused a suit in equity to be commenced against the said Crandall and White in this court; and your orators prayed, among other things in their bill of complaint filed against the said Crandall and White, for a writ of injunction to be issued against

the said Crandall and White, their agents, attorneys, servants, and workmen, and each of them, enjoining them from further infringing the rights secured to your orators as the owners of the letters-patent aforesaid. And your orators fully set forth in their said bill of complaint all their rights secured to them as the owners of said letters-patent, as by reference to said bill of complaint, as a part of the record of the proceedings in such case, now remaining in the office of the clerk of said court, or a duly-authenticated copy thereof, will appear. And your orators further show to your honors, that the said defendants, Crandall and White, duly caused their appearance to be entered in said suit, and in defense of the suit commenced against them by your orators as aforesaid, they duly put in their answer to your orators' said bill of complaint, fully denying every material allegation of your orators' said bill exhibited against them, and among other things, denying that the said John G. Treadwell and the said William Hailes were the original and first inventors of the alleged inventions and improvements patented by said patents or either of them, as set forth in said bill; and the said Crandall and White, in their said answer, set up and alleged on information and belief, that the subject-matters of the said alleged inventions and improvements of the said Treadwell and Hailes, as set forth and described in said letters-patent, were known and publicly used by divers persons, companies, and firms who had such prior knowledge, and who had publicly used the same. And the said defendants specified the names and places of residence and business of divers persons, companies, and firms who, they alleged, had so known and used said invention and improvements. And the said defendants, in their said answer, denied the validity of the patents aforesaid, and put in, in due and legal form, every alleged defense in their said answer which it would be possible or allowable to be made by the rules of equitable pleading, as by reference to their said answer, to be found in the record and proceedings in said suit, now remaining in the office of the clerk of this court, or a duly-authenticated copy thereof, will appear.

10 And your orators further show to your honors that the said complainants, William Hailes and Ellen T. Treadwell, in due and legal form put in their replication to the said answer and defense of the said Crandall and White, and thereupon an issue was formed upon the pleadings in such suit, involving the validity of the patents aforesaid, and the rights of your orators to the rights and privileges secured by them to your orators as the assignees and owners of said letters-patent No. 39535, and said re-issued letters-patent No. 1397, as hereinbefore set forth and described; and that such proceedings were afterwards had by the said parties to said suit; that said issues came on to be heard and decided before the Honorable Justice Nelson and Judge Smalley at a regular term of this court, holden at the city of Albany, within and for said Northern district, on the 10th day of October, 1865; at which said term the honorable court rendered a decree in said suit in favor of your orators and against the said Crandall and White, decreeing the validity of the said patents and the rights of your orators under the same, as by reference to said order and decree to be found in the record of the proceedings had in said cause, now remaining in the office of the clerk of this court, or a duly authenticated copy thereof, will appear. And your orators thus show to your honors, that the validity of their said patents, and each and every of them, have been fully adjudicated and determined by this honorable court in their favor and in support of the validity of the same and each of them; and that the rights of your orators to said letters-patent, and to each and every of them have also been

fully adjudicated and determined by this honorable court; and to all and singular the rights, liberties, and privileges secured thereby, all of which was and is well known to these defendants, Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes, and each of them, yet the said defendants, Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes, well knowing the premises and the rights secured to and acquired by your orators as aforesaid, and well knowing that the validity of said letters-patent, and each of them, had been adjudicated by this honorable court and had been determined in favor of the rights of your orators; and that the rights of your orators to and under said letters-patent had also been fully adjudicated by this court and determined in favor of your orators, but
11 contriving to injure your orators and to deprive them of the benefits and advantages which might and otherwise would accrue unto them from said inventions and improvements, did, after the aforesaid assignments of the said letters-patent, and each of them, in manner as aforesaid set forth, and after the adjudications by this honorable court of the validity of the said letters-patent and of the rights of your orators in the premises and before the commencement of this suit, to wit, at Albany, aforesaid, and within the said district, and at various other places in the United States, without the license or allowance, and against the will of your orators, and in violation of their rights and in infringement of the letters-patent aforesaid and of the re-issued letters-patent aforesaid, unlawfully and wrongfully, and in defiance of the rights of your orators, make, construct, use and vend to others to be used, the inventions and improvements patented in and by said letters-patent first above-mentioned, and by said re-issued letters-patent before mentioned, and that the said last-named defendants did make and use, and vend to others to be used, stoves made according to and using and employing said aforementioned inventions and improvements so secured to your orators as aforesaid; and that the said defendants have o infringed the rights and privileges of your orators secured to them by the letters-patent aforesaid in manner aforesaid; and that they are still continuing to infringe the rights and privileges so granted to your orators aforesaid; and that the said defendants last-mentioned still continue to infringe the rights and privileges granted to your orators in and by the said re-issued letters-patent in manner and form as alleged aforesaid.

And your orators further represent that they have repeatedly requested the said defendants to desist from the further infringement of the said letters-patent so owned and held by your orators, and the rights and privileges granted to your orators in and by said letters-patent, original and re-issued as aforesaid, and to desist from applying to stoves manufactured by the said defendants, the said inventions and improvements patented by said letters-patent, or either of them; and also, to desist from selling stoves containing such inventions and improvements. But the said defendants have utterly disregarded said requests of your orators, and have continued to use said inventions and improvements, and to manufacture and sell stoves containing said patented improvements, in defiance of the rights of your orators,
12 and they threaten that they will continue to make, use, sell, and put into market, more of the stoves containing said patented improvements, in violation of the exclusive rights and privileges of your orators, and in infringement of the said original and re-issued letters-patent so owned and held by your orators, and upon which this suit is brought.

And your orators further show to your honors that the aforesaid actings and doings of the defendants are all in defiance of the rights of your orators as aforesaid, and tend to their great and irreparable loss and injury, and by means of which they have been and still are being deprived of great gains and profits which they might and otherwise would have obtained, but which have been received and enjoyed by the said defendants, and by and through their aforesaid unlawful acts and doings.

And your orators further show unto your honors, on information and belief, that the said defendants have made and realized large gains, profits, and advantage from the use of the said inventions and improvements, and from the sale of stoves containing the said patented improvements, and from their infringement of each of the said letters-patent as aforesaid, and to which your orators are entitled, but how much exactly your orators are unable to say, because they do not know, and therefore pray a discovery thereof.

And your orators say that the use of the said inventions and improvements by the said defendants, and their avowed determination to continue to do so, and their other aforesaid unlawful acts, in disregard of your orators' said patents, and in defiance of your orators' said rights, have the effect to encourage others to venture to infringe the said letters-patent in disregard of your orators' aforesaid rights. Your orators further state to your honors, that the said defendants, Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes, have had notice of their said infringements of the said several letters-patent so owned and held by your orators, and have been requested to refrain therefrom; but they have disregarded said notice, and have utterly refused to desist from such infringements.

Wherefore, forasmuch as your orators can have no adequate relief in the premises except in this court, to that end they therefore pray that the said defendants, and each of them, may, if they can, show why your orators should not have the relief herein and hereby prayed, and that they, and each of them, may, upon their corporal oaths, according to their, and each of their, best, utmost knowledge, remembrance, information, and belief, full, true, direct, and perfect answers make to the premises, and to all the several matters hereinbefore stated and charged, as fully and particularly as if severally and separately interrogated as to each and every of said matters, and may be compelled to account for and pay over to your orators the profits by them and each of them acquired and the damages suffered by your orators from their aforesaid unlawful acts.

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And your orators pray that the said Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes may each of them be made party defendants to this bill of complaint, and that they and each of them, and each of their servants, agents, and attorneys, workmen and employees, may be restrained and enjoined by the order and injunction of this honorable court from directly or indirectly making, constructing, using, vending, delivering, working, or putting into use, practice, or operation, or in any way counterfeiting or imitating the said inventions, or either of them, or any part thereof, and that they may be desired to pay the costs of this suit; and that your orators may have such other and further relief as the court shall seem just and proper as being agreeable to equity.

May it please your honors to grant to your orators the writ of injunction, issuing out of and under the seal of this honorable court, commanding, enjoining, and restraining the said Jasper Van Wor-

mer, Michael McGarvey, Abram Mann, and Joseph C. Barnes, and each of them, and their servants, agents, attorneys, and workmen, as hereinbefore prayed.

And may it please your honors to grant unto your orators the writ of subpœna, issuing out of and under the seal of this honorable court, directed to the said defendants, commanding them and each of them, by a certain time therein named, and under a certain penalty, to be and appear in this honorable court, then and there to answer the premises, and to stand to and abide such order and decree as may be made against them.

WILLIAM HAILES.
ELLEN T. TREADWELL.

JOEL TIFFANY,
Solicitor for Complainants.

14 UNITED STATES OF AMERICA,
Northern District of New York, ss:

On this 23d day of July, 1867, before me personally appeared William Hailes and Ellen T. Treadwell, the above-named complainants, who, being duly sworn, depose and say that they have read the foregoing bill of complaint subscribed by them and know the contents thereof, and that the same is true of their own knowledge except as to matters and things therein stated as being made on information and belief, and as to those matters they believe them to be true.

WORTHINGTON FROTHINGHAM,
United States Commissioner.

(Endorsed:) In circuit court, northern district of New York. William Hailes & Ellen T. Treadwell vs. Jasper Van Wormer, Michael McGarvey, Abram Mann, & Joseph C. Barnes. Bill of complaint. J. Tiffany, pl'ffs' sol'r. Filed September 25, 1867.

15 [L. S.] The President of the United States of America to Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes, greeting:

You are hereby commanded that you personally appear before the judges of the circuit court of the United States for the northern district of New York, in the second circuit, on the first Monday November next, to answer to a bill of complaint exhibited against you in the said court by William Hailes & Ellen T. Treadwell, and to do further and receive whatever said court shall have considered in that behalf; and this you are not to omit under the penalty of two hundred and fifty dollars.

Witness the Honorable Salmon P. Chase, Chief Justice of the Supreme Court of the United States, at the city of Utica, in said northern district, the 25th day of September, eighteen hundred and sixty-seven.

AUG. A. BOYCE, *Clerk.*

J. TIFFANY,
Solicitor for Plaintiff.

MEMORANDUM.—The defendant is to enter his appearance, in the suit above mentioned, in the clerk's office, at Utica, on or before the day at which the above subpœna is returnable; otherwise the bill may be taken pro confesso.

J. TIFFANY,
Solicitor for Plaintiff.

16 (Endorsed:) U. S. circuit court, northern dis't of N. Y. In equity. William Hailes and Ellen T. Treadwell vs. Jasper Van Wormer et al. Subpœna. J. Tiffany, pl'ffs' sol'r. Filed Sept. 27, 1867.

I served the within subpœna on the defendants, Jasper Van Wormer, Michael McGarvey, Abram Mann, & Joseph C. Barnes, at Albany on the 26th day of September, 1867, by showing this original & delivering a copy thereof to each of said defendants.

JOHN A. SOMERS,
Special Deputy.

I hereby depute John A. Somers to execute the within process.

DANIEL DONALDSON,
U. S. Deputy Marshal.

17 Circuit court of the United States, northern district of New York. In equity.

The answer of Jasper Van Wormer, Michael McGarvey, Abram Mann, & Joseph C. Barnes, defendants, to the bill of complaint of William Hailes and Ellen T. Treadwell, complainants.

These defendants, saving and reserving to themselves all right of exception to the said bill of complaint, for answer thereto say: That they are informed and believe, and therefore admit, that letters-patent of the United States for alleged improvements in coal-stoves were granted to Martin L. Mead and William Hailes, dated the 11th day of August, 1863, and marked number 39535, mentioned in said bill; and that re-
issued letters-patent of the United States for an alleged improve-
18 ment in stoves were granted to William Hailes and Ellen T. Treadwell, the said complainants, dated the 3d day of February, 1863, and marked Re-issue, number 1397, mentioned in said bill; and that said patents were, respectively, granted for the term of years stated in said bill.

But the said defendants, further answering, say they have no knowledge or information, save as derived from said bill of complaint, and therefore cannot state whether or not John G. Treadwell, in said bill named, made the assignment in said bill mentioned to Martin L. Mead
of the alleged interest of him, said Treadwell, of, in, and to the
19 said alleged inventions and improvements described in the specification annexed to said letters-patent of August 11th, 1863; or whether or not any such assignment was ever recorded in the Patent-Office of the United States; or whether or not the said Martin L. Mead, by means of any such assignment from said John G. Treadwell, or otherwise, became the owner of one undivided half of said alleged inventions or improvements, or equally interested therein, with the said Hailes; or whether or not due application was made for the issue of said last-mentioned letters-patent; or whether or not, on the 2d of March, 1864, the said Martin L. Mead made an assignment in writing to said Ellen T. Treadwell of all his right, title, and interest in and to said last-mentioned letters-patent, or to the inventions and improvements therein set forth and described; or whether or not any such assignment was duly recorded in the Patent-Office of the United States, as in said bill of complaint alleged in reference to said several matters; and they therefore leave the said complaints to make proof thereof.

And these defendants, further answering, say they have no knowl-

edge or information, save as derived from said bill of complaint, and therefore cannot state whether or not letters-patent of the United States for alleged improvements in stoves, bearing date on the 7th day of May, 1861, were granted to said William Hailes and Ellen T. Treadwell, as assignees of John G. Treadwell and William Hailes; or whether or not due application was made therefor; or whether or not any such letters-patent were duly surrendered by the said William Hailes and Ellen T. Treadwell to the said Patent-Office; or whether or not the same were then and there duly canceled, or whether or not such re-issue of February 3d, 1863, was obtained upon due compliance with the requirements of the act of Congress in such case made and provided, as in said bill of complaint alleged in reference to said several matters; and therefore they leave the said complainants to make due proof of the same.

And these defendants, further answering on information and belief, deny that said John G. Treadwell and William Hailes were the original and first inventors, or that either of them was the original and first inventor of the alleged inventions and improvements mentioned and described in the specifications and drawings, respectively, annexed to said letters-patent of August 11, 1863, and to said re-issued letters-patent of February 3d, 1863, or of either or any of said alleged inventions or improvements, or of any material or substantial part thereof.

But, on the contrary, these defendants, upon information and belief, allege and say that all of said alleged inventions and improvements were, long prior to any invention or discovery thereof by said Treadwell and Hailes, or either of them, well known to and publicly manufactured, sold, and used by various persons, both in this and other countries; and that among the persons who thus knew of and publicly manufactured, used, and sold the said inventions and improvements are the following, to wit:

Dr. Eliphalet Nott, then of Schenectady, in the State of New York, who, more than thirty years ago, knew of and publicly made, used, and sold the same at the city of New York, and also at Schenectady aforesaid.

Jordan L. Mott, then of the city and county of New York, in the State of New York, who knew of and publicly made, used, and sold the same at the said city of New York prior to any invention thereof by said Treadwell and Hailes.

James McGregor, jr., formerly of New York City, who, prior to any invention thereof by said Treadwell and Hailes, knew of and publicly made, used, and sold the same at the cities of New York and Albany and other places.

Samuel B. Sexton, of Baltimore, in Maryland, who, as early as the year 1859, knew of and publicly made, used, and sold the same at Baltimore aforesaid.

Joseph C. Henderson, then of Albany, N. Y., who had such knowledge of and publicly made, used, and sold the same at Albany aforesaid, and elsewhere, prior to any invention thereof by said Treadwell and Hailes.

Jasper Van Wormer and Michael McGarvey, two of the defendants herein, who had such knowledge of and publicly made and used the same at the city of Albany aforesaid, prior to any invention thereof by said Treadwell and Hailes.

And also James A. Munsell and Robert B. Thompson, of the city of New York, who had such knowledge of and publicly made, used, and

sold the same at New York aforesaid, prior to any invention thereof by said Treadwell and Hailes.

And also, that the said alleged inventions and improvements, and the substantial and material parts thereof, were, long prior to any
21 invention thereof by said Treadwell and Hailes, or either of them, described in various public works and publications, and in various letters-patent, as follows, to wit:

In letters-patent, granted by the government of France to Mr. Walker, for improvement in apparatus for heating, dated September 12, 1849, and in a certificate additional, dated August 26th, 1850, which said letters-patent and certificate are published in a certain public work called "Brevets D'Invention," in volume 16, on page 267, &c., issued in the year 1854.

In letters-patent, granted by the government of England to Harper and Watkins, dated May 10th, 1839.

In letters-patent of the United States, granted to James McGregor, jr., of New York, for improvement in stoves, dated January 6th, 1846.

In letters-patent of the United States, granted to Samuel B. Sexton, of Baltimore, Maryland, for improvement in stoves, dated April 19th, 1859, and numbered 23716, and in a re-issue thereof to said Sexton, dated December 3d, 1861, and numbered 1242.

And in letters-patent of the United States, granted to Joseph C. Henderson, of Albany, New York, for improvement in stoves, &c., dated May 29th, 1860, and numbered 28482, and in a re-issue thereof, to said Henderson, dated June 30th, 1863, and numbered 1506.

And these defendants, further answering upon information and belief, deny that the complainants, by virtue of said letters-patent of August 11th, 1863, and said re-issued letters-patent of February 3d, 1863, or of either of them, became, or now are, the sole and exclusive owners of said alleged inventions and improvements, or of any or either of them, or of any part thereof, or became entitled to the exclusive use thereof, as stated and claimed in said bill of complaint.

And these defendants, on information and belief, deny that each or any of the said alleged inventions or improvements have been, or are, of great utility or value; and they deny that said alleged inventions or improvements, or any of them, have been employed by said complainants, or by their former alleged owners, to their great benefit or to the advantage of the public; and they deny that the public have generally acknowledged or acquiesced in the said alleged rights of said complainants, or that the said complainants can or will receive or realize large gains and profits from the use and sale of said alleged inventions and improvements.

22 And said defendants, further answering, on information and belief, deny that said letters-patent of August 11th, 1863, or said re-issued letters-patent of February 3d, 1863, were infringed by Henry Crandall and Silas A. White, as in said bill of complaint alleged and set forth. But on information and belief, these defendants admit that said complainants did cause a suit in equity to be commenced against the said Crandall and White, in this court, for an alleged infringement of said two patents, and that said Crandall and White appeared in said suit and put in their answer therein, and that said complainants filed their replication to said answer, and that issue was joined therein, as stated in the said bill of complaint herein. But these defendants, on information and belief, say that in truth and in fact said Crandall and White did not thereafter defend said suit, nor did they seek to establish the defenses set up in their said answer, nor to introduce any evidence

whatever in support thereof, nor in any way to litigate or try the issues raised thereby, but on the contrary thereof, said Crandall and White, in pursuance of an arrangement made with said complainants, permitted and allowed said suit to go to a hearing solely on testimony produced by the complainants, and without any argument whatever being made in the behalf of said Crandall and White. That the decree rendered in said suit was made upon proceedings essentially and substantially ex parte in their character, and was not made upon a bona-fide litigation or trial of the issues in said suit.

And these defendants deny that the validity of said two patents, or either of them, has been fully adjudicated and determined by this honorable court in their favor, or in support of the validity of the same, or of either of them; or that the rights of said complainants to each and every of them, or to either of them, or to either or all of the rights, liberties, or privileges secured by said patents or either of them, have been adjudicated by this court, or that these defendants have any knowledge or information of any adjudication thereon whatever, except as above stated.

And these defendants, further answering, deny that they or either of them, have or has at any time whatsoever, either before or since the commencement of this suit, at Albany, or at any other place, in any way or manner, directly or indirectly, by themselves, or by their agents, or servants, made, constructed, used, or vended to others to be
23 used, or that they now make, construct, use, or vend to others to be used, any of the alleged inventions or improvements patented in and by said two letters-patent, or either of them. And they deny that they have at any time or place, in any way or manner, themselves, or by their agents or servants, directly or indirectly, made or used, or vended to others to be used, or that they now make, or use, or vend to others to be used, stoves made according to, or using, or employing any of the inventions or improvements secured to said complainants by said two letters-patent, or either of them; or that they have in any way or manner, at any time or place, infringed upon, or now infringe upon any of the rights or privileges secured to said complainants by the said two letters-patent, or either of them.

And these defendants, further answering, admit that said complainants have requested them to desist and refrain from infringing upon said letters-patent and the rights of said complainants thereunder, as in said complaint stated, but these defendants deny that they have disregarded in any way the said request, or that they have continued, or now continue to use said alleged inventions or improvements, or to manufacture or sell stoves containing said patented improvements in defiance of any rights of said complainants or otherwise, or that they have threatened or do now threaten that they will continue to make, use, sell, and put into market any stoves containing said alleged patented improvements, in violation of any exclusive rights and privileges of said complainants, or otherwise, or in infringement of either the said original or said re-issued letters-patent, so alleged to be owned and held by said complainants, and upon which this suit is brought.

And these defendants further answering, deny that any actings or doings whatsoever, of any kind or nature of these defendants, are or have been in defiance of any rights of said complainants under said two letters-patent, or either of them; or that they or any of them tend or have tended to the great or irreparable loss, or injury, or to any loss or injury whatsoever, of said complainants; and they deny that by means of any actings or doings of these defendants, the said complainants have

esq., United States commissioner, at his office, No. 69 State street, in the city of Albany, N. Y.; and may take such of their proofs and testimony as they desire to have taken in the southern district of
28 New York before either Richard E. Stillwell or Keneth G. White, esquires, United States commissioners, as from time to time may be convenient, at the office of said commissioners, No. 41 Chambers street, in the city of New York, upon ten days' previous notice, in writing, to the other party, of the time and place of the taking thereof; and that the testimony so taken may be returned and filed with the clerk of this court, and, when filed, may be opened by him, and be used and read by either party, on the hearing of this cause, as proofs duly and regularly taken for such hearing, subject to all objections noted in the taking of such proofs by the officer before whom the same is taken. And it is further stipulated that the time of taking proofs in this cause be, and the same is hereby, extended until and including the 14th day of September, 1868.

Dated May 16th, 1868.

JOEL TIFFANY,
Solicitor for Complainants.
J. C. McCLURE,
Sol'r for Def'ts.

29 (Endorsed:) Circuit court of the United States, northern district of New York. In equity. William Hailes et al. vs. Jasper Van Wormer et al. Stipulation as to taking testimony.

A. A. BOYCE, Esq., *Clerk:*

D'R SIR: Please file this stipulation, & enter roll in accordance therewith.

Y'rs,

J. C. McCLURE, *Sol. for Def'ts.*

Filed May 19, 1868.

30

31 Circuit court of the United States, northern district of New York.
In equity.

WILLIAM HAILES ET AL.
vs.
JASPER VAN WORMER ET AL.

It is hereby stipulated and agreed by and between the solicitors for the respective parties in the above-entitled suit, that on filing this stipulation with the clerk of this court, a rule or order may be entered herein as of the 3rd day of September, 1868, to the following effect, namely:

That the proofs and testimony on the part of the defendants herein may be taken before William H. Bishop, esquire, notary public, of the city of New York, at his office, No. 7 Warren street, in said city,
32 upon five days' notice, to the solicitor for complainants; and said William H. Bishop is hereby appointed special examiner for that purpose; and that the testimony so taken may be returned and filed with the clerk of this court, and, when filed, may be opened by him and be used and read by either party, on the hearing of this cause, as

proofs duly and regularly taken for such hearing, subject to all objections noted in the taking of such proofs; and it is ordered that the time for taking proofs in this cause be, and the same is hereby, extended until the 15th day of October, 1868.

Dated Albany, September 3rd, 1868.

J. C. McCLURE,
Sol. for Def'ts.
JOEL TIFFANY,
Sol. for Complainants.

33 (Endorsed:) Hailes & Treadwell vs. Van Wormer & McGarvey. Stipulation. J. C. McClure, sol. for def'ts, Albany, N. Y. Filed Dec. 3rd, 1868.

34

35 JUNE 18, 1870.

Present, Hon. L. B. Woodruff, circuit judge.

WILLIAM HAILES AND ELLEN T. TREADWELL
ag.
JASPER VAN WORMER ET AL.

Suggest the death of Ellen T. Treadwell, and ask for an order that her husband and administrator be substituted as a party complainant.

It appearing to the court that Ellen T. Treadwell, one of the complainants, has deceased, and that John G. Treadwell has been duly appointed administrator of the estate of the said complainant, deceased, on motion of Joel Tiffany, solicitor for complainants, it is ordered that said administrator be substituted as party complainant in the place of the said Ellen T. Treadwell, deceased.

36 WILLIAM HAILES AND JOHN G. TREADwell, administrators on the estate of Ellen T. Treadwell, deceased,
vs.
JASPER VAN WORMER ET AL.

(Endorsed:) William Hailes & Ellen T. Treadwell vs. Jasper Van Wormer et al. Suggestions of clerk of co., pl'ffs. J. Tiffany, for pl'ff. Filed June 18, 1870.

36½ At a stated term of the circuit court of the United States of America for the northern district of New York, in the second circuit, held at the village of Canandaigua, on the 3d Tuesday of June, in the year of our Lord one thousand eight hundred and seventy.

Present, the Honorable Lewis B. Woodruff, judge.

WILLIAM HAILES & ANOTHER
vs.
JASPER VAN WORMER & OTHERS.

This cause having heretofore come on for argument on pleadings and proofs, and having been argued by counsel for the respective parties; and the court having considered the same, ordered that the bill of complaint herein be, and the same is hereby, dismissed with costs.

37 Circuit court of the United States, northern district of New York, in equity.

WILLIAM HAILES ET AL.
vs.
JASPER VAN WORMER ET AL.

It is hereby stipulated by and between the plaintiffs and the defendants in the above-entitled action that the clerk of this court may tax the costs of the defendants, to be entered in the judgment of dismissal herein, at the sum of two hundred and fifty dollars, upon this stipulation being filed with him.

Albany, Sept. 21st, 1870.

JOEL TIFFANY,
Sol. for Compl's.
J. C. McCLURE,
Sol. for Def'ts.

38 (Endorsed:) Circuit court of the U. S., northern district of New York, in equity. William Hailes et al. vs. Joseph Van Wormer et al. Stipulation as to am't of def's' costs to be entered in decree of dismissal. J. C. McClure, sol. for def'ts. Albany, N. Y. Filed Sept. 27, 1870.

39 Therefore the said costs of the defendants are hereby taxed, as stipulated, at two hundred and fifty dollars, ($250%:)

Whereupon the said pleadings, and also the costs and other papers, are now here attached together and hereto annexed, and the said decree enrolled and signed according to law.

Judgment signed and decree enrolled this 22d day of October, A. D. 1870.

CHARLES MASON, *Clerk.*

40 (Endorsed:) United States circuit court, northern district of New York, in equity. William Hailes and John G. Treadwell' administrators of the estate of Ellen T. Treadwell, vs. Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes. Enrolled decree, J. C. McClure, def'ts' sol. $250 taxed costs. 3 p. m. Filed Oct. 22, 1870.

41 EXHIBIT B.—*Re-issue No.* 1397.

The United States of America to all to whom these letters-patent shall come:

Whereas John G. Treadwell and William Hailes, of Albany, New York, (assignors to William Hailes aforesaid, and Ellen T. Treadwell,) have alleged that they have invented a new and useful improvement in stoves, (for which letters-patent were issued to them, dated May 7, 1861, which letters having been surrendered by them, the same have been cancelled, and new letters ordered to issue to said assignees on an amended specification,) which they state has not been known or used before their application, have made oath that they are citizens of the United States; that they do verily believe that they are the original and first inventors or discoverers of the said improvement, and that the same hath not, to the best of their knowledge and belief,

42 been previously known or used; have paid into the Treasury of

the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are, therefore, to grant, according to law, to the said William Hailes and Ellen T. Treadwell, their heirs, administrators, or assigns, for the term of seventeen years from the seventh day of May, one thousand eight hundred and sixty-one, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said John G. Treadwell and William Hailes in the schedule hereunto annexed, and is made a part of these presents.

43 In testimony whereof I have caused these letters to be made patent, and the seal of the Patent-Office has been hereunto affixed. Given under my hand, at the city of Washington, this third day of February, in the year of our Lord one thousand eight hundred and sixty-three, and of the Independence of the United States of America the eighty-seventh.

J. P. USHER,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent-Office.
[SEAL.] D. P. HOLLOWAY,
Commissioner of Patents.

45 The schedule referred to in these letters-patent, and making part of the same.

To all whom it may concern:

Be it known that John G. Treadwell and William Hailes, of Albany, in the State of New York, are the inventors of certain new and useful improvements in base-burning stoves or furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which:

Fig. 1 is a vertical section in a line at right angles to the smoke and draught-flue.

Fig. 2 is a similar section directly through the smoke and draught-flue.

Fig. 3 is an inverted horizontal section through the base part of the stove in the line xx of fig. 2.

Fig. 4 is a perspective view of the fire-pot and of the under side of the lower portion of the coal-reservoir, as the same appear when separated from each other.

The same letters of reference in the several figures indicate corresponding parts.

The subject of base-burning or reservoir-stoves and heaters has long engaged the attention of the public, and the success of this class of stoves is no longer a question of doubt, and the value thereof is an every-day experience of hundreds in different parts of the country, and the only question that now remains to be solved is, which is the best or most economical and beneficial mode of embodying the principle involved in such stoves and heaters?

Our experience in this class of stoves is that the most beneficial effects are to be secured from an organization which does not pass the products of combustion up, around, and over the top of the coal-supply reservoir, so as to heat a surrounding jacket thereof, but heats a circulating or

ascending body of air by means of radiated heat from the fire-pot, and at the same time heats the base of the stove by means of direct heat, circulating through descending flues which lead into the ash-pit or around it, and to the smoke and draught flue. Also that the greatest economy, considering the increased benefits secured from supplying coal continuously out of a reservoir, is attained with an arrangement which holds the superincumbent body of coal in suspension, such arrangement being a reservoir with a contracted discharge extending
46 slightly down into a flaring or enlarged fire-pot, around or above the whole upper edge of which, outside of the contracted discharge of the coal-supply reservoir, the flame is allowed to circulate, and therefrom caused to descend and circulate around or under the base portion of the stove in its passage to the smoke and draught flue.

The effect of the first-named plan is to husband the radiated heat and use it for the purpose of warming the upper part of the stove and the room in which it is situated, as well as for heating air for warming rooms above, if desirable, and at the same time to so confine the direct fire-heat and keep it in contact with the base portion of the stove a sufficient length of time as to insure the warming of the same to a comfortable degree.

The effect of the second plan is to relieve the incandescent coal from the weight of the body of superincumbent coal, and thus obviate a compression of the incandescent coal in the fire-pot, and secure for the flame a free expansion in a lively and brilliant manner, and thus enable it to act with great heating effect upon the lower portion of the stove in its passage to the smoke and draught flue.

With the view of organizing a stove or heater which operates on the base-burning or coal-supply reservoir principle, and at the same time embraces the two plans of operation above referred to, we have devised the following plan of construction:

A is a base of our stove, constructed with a chamber B, which extends around and beneath the top-plate of the said base. In this chamber air may be admitted through the front passage A. Upon the top-plate of the base A is erected a support C, for horizontal grate D, and a fire-pot E, as shown. The support forms a chamber below the grate, and out of the front of the support a portion of metal is removed as at b, so that air to the fire on the grate may have free access when the ordinary regulator or damper is open. In order to insure the passage of the air to the fire only from below the grate, a cut-off *c* extends out from the upper front part of the support C, and rests upon the two lateral stops d, which extend out from the front of the support, as shown. The top plate of the base, at points outside of the support C, is perforated with three apertures, F, F^1, F^2, which communicate with the chamber B. The apertures F^1, F^2, have vertical pipes F^3, F^4, placed in
or around them, while the aperture F has the draught and smoke
47 pipe or flue F^5 placed in or around it, as shown. The pipes F^3 F^4, extend up to the upper rim of the fire-pot E, and connect to perforated flanges or ears of said pot, so that a space f exists between the pipes and fire-pot, as shown. The outer portion of the top edge of the pipes F^3, F^4, protrudes above the flanges to a slight degree, as indicated at g, g.

The fire-pot flares at top and contracts at its bottom; the flare and contraction are gradual. The section of the metal, of which the pot is made, shows a gradual decrease in thickness from the center of the depth of the pot in an up and downward direction, as indicated at 1, 2, 3. This construction or form of the metal insures an equable heatin

of the pot at all parts, and a uniform expansion and contraction by the principle of conduction, the thickest and most intensely heated portion imparting to the thinnest or less intensely heated portions a large amount of its heat, on the principle just mentioned.

Above the fire-pot and vertical pipes the coal-supply reservoir G is arranged. This reservoir is constructed with a flange h at its base, said flange turning down at its outer edge so as to form a right angle, or thereabouts, as shown at i. The rim *i* of the flange fits down upon the rim of the fire-pot and encloses the top opening of the fire-pot of the vertical pipes within a continuous chamber j, as represented; the said chamber constituting an enlargement to the upper portion of the fire-pot, as it were, and thus giving increased room for the expansion of the flame.

The diameter of the coal reservoir is decreased below the point where the body of supply coal is suspended by means of an extension or ring-flange K, which is in form of an inverted frustum of a cone. This flanch also serves, in connection with a detachable ring v, which, also, is in form of an inverted frustum of a cone, to form a frame or sash for the reception of fire-brick or other fire-proof material, as shown at m. The ring v has a horizontal flanch and bolts; by the same, to the under side of the flange n of the coal-supply reservoir. The fire-brick are shaped so as to form, when put together, an inverted frustum of a cone, and they, therefore, when clamped between the devices k, v, cannot descend, separately, out of their places, nor can they do so unitedly, as the largest circumference of the conic frustum *m* cannot pass through the space between the lower ends of the devices k, v. It will be observed that the fire-brick continues the contraction of the coal-supply reservoir, and thus insure a gradual descent of the supply coal
48 upon the central part of the bed of incandescent coal, and at the same time leave a large and open space outside of the conic frustum *m*, for the free burning and expanding of the gases or flame. This result is also furthered by the dishing form of the flange h, the same forming a large circulating flame-channel, *j*, all round the upper edge of the fire-pot, as illustrated.

The reservoir G is continued up to a horizontal division-plate I of the stove, by means of an extension G^1, as shown. The division plate I has a large coal-induction hole n in its center and several hot air passages *o o* near its circumference or outside of the circle of the coal-supply reservoir, as shown. Around the central hole n there is constructed a small, combined cylindric and conic hopper J, which is furnished with an adjustable valve *s*, and a removable cover-plate J^2, as hereinafter described. Through and from the rear of this hopper there extends a branch draught-flue *r*, the same leading into the main draught-flue E^5, as shown. In order to open and close this flue (*r*) and also to open and close the induction-hole to the coal-supply reservoir, the taper-valve *s* is fitted to the lower part of the hopper J, and up from the center of the back of this valve a vertical rod s^1 extends and passes through the removable cover-plate J^2 of the hopper, and also through a weight s^2, as shown. The weight s^2 is not level on its bottom with the top surface of the cover-plate J^2, nor is the quantity of metal on one side of the rod as great as that on the other side. The cover-plate—the valve—the rod, and the weight, are all connected together, so that by taking hold of the rod the whole can be lifted together, that is, when the valve is raised, first, to its full stroke; but the connection is also such that, when the valve is required to be raised a less distance than its full stroke, the movement of the valve is independent of the cover-plate J^2; there-

fore the branch-flue *r* can be opened and closed or the damper-valve adjusted without disturbing the cover-plate, and whenever such an adjustment of the valve is made, the weight, by reason of its being unbalanced, will automatically bind upon the rod and hold it and the valve in suspension.

It is desirable to open the branch of the direct draught-flue when the fire is first started, and also before the cover-plate J^2 is removed, first, in order to obtain a powerful draught, and second, to pass off the pent-up gases in the coal reservoir through the branch-flue, instead of allowing them to puff out into the room at the time when fresh coals is being introduced.

The organization thus far described has but one shell, and in order to make it a double shell or wall-stove a casing, K, L, M, is placed around it from base to top. The part K of this casing encloses a portion of the fire-pot, and of the vertical pipes and draught-flue. This part is finely perforated all around so as to admit air to the first wall, to be heated as indicated at *w*. The part L of the casing encloses the remainder of the vertical pipes and fire-pot, and also a small portion of the coal-supply reservoir, but not the main draught or smoke flue. It is also finely perforated so as to admit cold air, as indicated at w^1. The part M of the casing encloses the remainder of the coal-supply reservoir, and extends up to and unites with a stationary top or finishing plate W^2. This part of the casing is not perforated, but the plate W^2 has perforations through it for the escape of the confined heated air W^3 into the room or into pipes leading to rooms above, as indicated by arrows W^4.

It will be seen that the air circulates all about the radiating surface, and thus protects the same from rapid destruction by the fire, and while this is the case the air is very thoroughly heated, and discharged in that state into the room where the stove is situated, or into other conductors.

We have given a minute description of one practical mode of embodying our invention, but in doing so we have not intended that we should be understood as confining ourselves to the details mentioned, as it is obvious that the invention may be embodied in various ways. For instance, one or more than two vertical pipes, like F^3, might be adopted. Again, the contraction of the discharge-end of the coal-supply reservoir, below the superincumbent body of coal, may be effected in various ways, and still not depart from the principle involved in holding the mass of coal in a chamber or section of a chamber which is of greater diameter than the section or part through which the coal is fed to the fire. For instance, a cylindric discharge of a given diameter connected with an upper extension of greater or gradually increasing diameter, above the discharge, would embody the principle involved in our reservoir. So also would two cylinders, one of a small diameter and the other of a large diameter, united by an inclined or horizontal shoulder.

It will be observed that we have a base-burning stove with a coal-supply reservoir and a hot-air chamber, which is adapted for heating the room in which it is situated, or the same and rooms above, and still the organization has but two walls or shells; and that, in connection with this, we have an arrangement which effectually heats the lower portion of the stove or structure, and also very perfectly controls the feed of the coal to the fire.

What is claimed as new herein, and as the invention of John G. Treadwell and William Hailes, is—

1st. A base-burning coal-supply reservoir stove, or furnace, so constructed that the products of combustion do not pass up around and above the supply reservoir, nor up through the grate, but down outside of the fire-pot toward the base of the stove, and out through a main draught-flue which leads directly from a space or chamber about the lower part of the stove, all for the purpose set forth, and substantially as described.

2d. The contracting of the discharge-end of the coal-supply reservoir, the expanding of the fire-pot, and the extending of the flame-passage downward for united operation in a base-burning coal-supply reservoir stove, or furnace, essentially as set forth.

3d. A fire-pot resting on a base, and imperforated on its inner or outer circumference, or from its inner to its outer circumference, and so constructed and applied, with respect to a coal-supply reservoir, that an enclosed horizontal chamber for the free expansion and circulation of the flame and gases is formed all around and outside of the contracted discharge, and above the upper edge of the fire-pot, substantially as and for the purpose set forth.

4th. The descending passage or passages in combination with the continuous flame-expansion and circulation passage, and a main draught-flue, leading out of the base or lower part of the stove or furnace, substantially as set forth and for the purpose described.

5th. Constructing the fire-pot of a base-burning coal-supply reservoir stove or furnace, with an imperforated circumference, and in form of a trumpet-mouth at its upper portion, in combination with descending flame-passages, substantially as described, and for the purpose set forth.

6th. Constructing the metal of the fire-pot with a gradually decreasing thickness from the centre of its depth, both up and downward, substantially as described.

7th. A dotachable ring in combination with a fixed ring flanch of a coal-supply reservoir, for the purpose of confining the fire-brick or other fire-proof substance on the lower part of the reservoir.

51 8th. The combination of a perforated jacket or casing—a coal-supply reservoir with a contracted discharge—a fire-pot with a flame-expansion chamber around and above its upper edge, and a descending flue or flues, and a main draught-flue, substantially as and for the purpose described.

9th. The combination, in a base-burning coal-supply reservoir-stove, of a descending flue or flues, and a perforated casing, substantially as and for the purpose set forth.

10th. In a base-burning coal-supply reservoir-stove or furnace, we claim a branch-flue, opened and closed by a damper, above the base of the fire-pot, in combination with a descending passage or passages leading to the lower part of the stove, and with the main draught-flue leading out of the lower part of the stove, substantially as and for the purposes set forth.

11th. The weight constructed and applied in connection with the damper-valve, in the manner and for the purpose set forth.

12th. The combination of the perforated jacket or case, the reservoir for coal, the fire-pot, the descending flue or flues, the hollow space about the base of the stove, and the chimney flue, whereby the base of the stove is heated by direct heat of the flame or gases, and the upper part

of the stove by radiated heat acting upon the circulating air, substantially as described.

JNO. G. TREADWELL.
WILLIAM HAILES.

Witness:
W. W. CRANNELL.
C. VAN ALLEN.

(Here follow two diagrams, marked pages 52 and 53.)

54 EXHIBIT C.—No. 39535.

The United States of America to all to whom these letters-patent shall come:

Whereas John G. Treadwell and William Hailes, of Albany, New York, have alleged that they have invented a new and useful improvement in coal-stoves, (they having assigned their right, title, and interest in said improvement to Martin L. Mead and William Hailes, of same place,) which they state has not been known or used before their application, have made oath that they are citizens of the United States, that they do verily believe that they are the original and first inventors or discoverers of the said improvement, and that the same hath not to the best of their knowledge and belief, been previously known or used; have paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose.

These are therefore to grant according to law to the said Mead and Hailes, their heirs, administrators, or assigns, for the term of seventeen years from the eleventh day of August, one thousand eight hundred and sixty-three, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Treadwell and Hailes, in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent-Office has been hereunto affixed. Given under my hand, at the city of Washington, this eleventh day of August, in the year of our Lord one thousand eight hundred and sixty-three, and of the independence of the United States of America the eighty-eighth.

[SEAL.] J. P. USHER,
Secretary of the Interior.

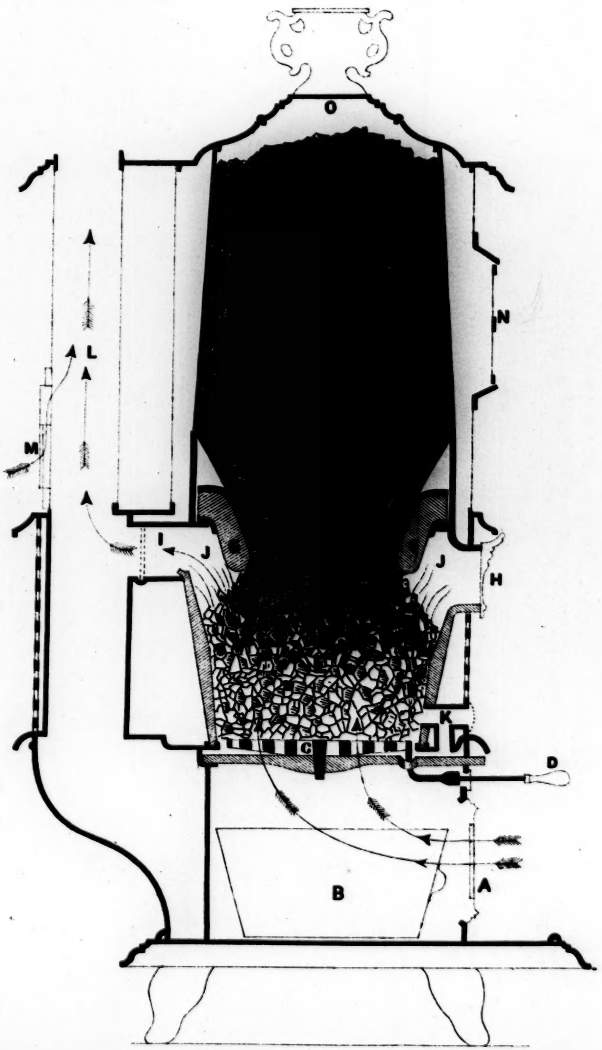
Countersigned and sealed with the seal of the Patent-Office.
D. P. HOLLOWAY, *Commissioner of Patents.*

55 The schedule referred to in these letters-patent and making part of the same.

To all whom it may concern:

Be it known that we, John G. Treadwell and William Hailes, both of Albany, in the county of Albany, and State of New York, have invented a new and useful improvement in base-burning reservoir-stoves; and we do hereby declare that the following is a full, clear, and exact

28



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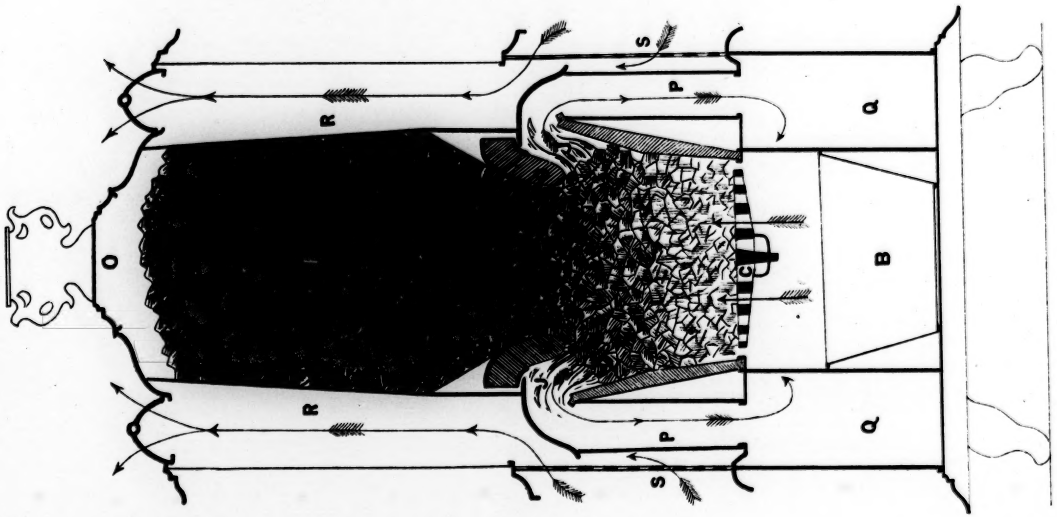

29

lescription of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Fig. 1 is a vertical longitudinal section of a stove patented by us at previous dates, with our improvements of the present date applied to it.

Fig. 2 is a perspective view of the fire-brick throat of the fuel-supply reservoir.

Fig. 3 is a perspective view of the portable auxiliary grate, on which the fire is first built to start the fire in the main grate.

Fig. 4 is a vertical transverse section of the whole stove.

Fig. 5 is a horizontal section looking upward.

Similar letters of reference in the several figures indicate corresponding parts.

The nature of this invention, which is an improvement on our stove patented May 7, 1861, and re-issued February 4, 1863, consists, 1st, in the construction of an illumination-window, or windows, at one or more points in the continuous flame-expansion chamber or channel which is about the base of the coal-supply reservoir and the top of the coal-burning fire-pot, in combination with a descending flue which leads to a chamber about the base of the stove, and from such chamber into a chimney-flue.

It consists, 2d, in the construction of a damper draft-flue in the continuous flame-expansion chamber or channel, located as just stated, in combination with a descending flue, which first leads down into a chamber about the base of the stove, and then into the chimney-flue, with which the damper draft-flue connects directly at the top of the fire-pot.

It consists, 3d, in the construction of the throat of the fuel-supply chamber of two rings of segment or angular form in their cross-section, and of fire-proof material, fitted between the rings, all in such manner that the throat of the reservoir is supported on the interior of
56 the stove, and forms a continuation of the fire-pot, and still not be a fixture, so far as bolts or other fastenings, which will not yield to expansion and contraction, are concerned, with either the stove or the fuel-reservoir.

It consists, 4th, in a poke-hole in the fire-pot, which has an angular branch-hole leading down into the ash-pan pit, whereby the live coals which are liable to fly out upon the floor when the poker is moved back and forth, are conducted down into the ash-pit.

It consists, 5th, in the adaptation of a portable grate with inclined top, a box-frame and legs and a handle, for use in combination with base-burning reservoir-stoves, whereby the starting of the fire in such stoves, although the supply-reservoir may be charged, is rendered a very convenient and ready matter.

It consists, 6th, in providing the ash-pan with apertures in its circumference, at opposite points, so that the poker may be inserted through these holes, and the pan carried out with hot ashes in it without liability of burning the hands.

To enable others skilled in the art to make and use our invention, we will proceed to describe the same with reference to the drawings.

As the main features of our present stove are shown in the letters-patent granted to us on the date heretofore mentioned, we do not deem it necessary to describe here anything more than those parts which we regard as essential changes and improvements on the stove described in said patent.

Our first improvement is carried into practice by casting the fire-pot A with a rectangular, elliptical, or circular extension, *a*, at one or more points of its upper edge. This enlargement we extend through an

62 In circuit court United States, northern district of New York, 2d circuit.

WILLIAM HAILES AND ELLEN T. TREADWELL
agt.
JASPER VAN WORMER, MICHAEL MCGARVEY, Abram Mann, and Joseph C. Barnes. } In equity.

JOHN C. MCCLURE,
Solicitor for Respondents:

SIR: Please take notice that the complainants in the above-entitled action will proceed to take testimony to be used in evidence on the hearing of the above-entitled cause, before Worthington Frothingham, at his office, No. 69 State street, Albany, commencing on the 12th day of June, 1868, at 10 o'clock a. m. of that day, and to continue from time to time until the complainants shall have fully examined as witnesses Dennis G. Littlefield, John S. Perry, Gray, and others, at which time and place you can attend and cross-examine the same as you shall think proper.

Albany, May 30, 1868.

JOEL TIFFANY,
Sol. for Complainant.

Received copy of the above notice.

J. C. MCCLURE,
Solicitor for Defendant.

At a special term of the circuit court of the United States of America for the northern district of New York, in the second circuit, held at the clerk's office in Utica on Tuesday, the 19th day of May, in the year of our Lord one thousand eight hundred and sixty-eight.

Present, the Honorable Nathan K. Hall, judge.

WILLIAM HAILES AND ELLEN T. TREADWELL
vs.
JASPER VAN WORMER, MICHAEL MCGARVEY, Abram Mann, and Joseph C. Barnes. } In equity.

On filing stipulation signed by the respective parties, it is now here, on motion of J. C. McClure, solicitor for defendants, ordered that either party may take such of their proofs and testimony herein as they desire to have taken in the northern district of New York, before
63 Worthington Frothingham, esq., United States commissioner, at his office, No. 69 State street, in the city of Albany, N. Y., and may take such of their proofs and testimony as they desire to have taken in the southern district of New York, before either Richard E. Stillwell or Kenneth G. White, esq's, United States commissioners, as from time to time may be convenient, at the office of said commissioners, No. 41 Chambers street, in the city of New York, upon ten days' previous notice in writing to the other party of the time and place of the taking thereof. And that the testimony so taken may be returned and filed with the clerk of this court, and when filed, may be opened by him and be used and read by either party on the hearing of this cause, as proofs duly and regularly taken for such hearing, subject to all objections noted in the taking of such proofs by the officer before whom the same is ta-

ken; and also ordered that the time of taking proofs in this cause be, and the same is hereby, extended until and including the 14th day of September, 1868.

(A copy as filed and entered on docket.)

Witness my hand and official seal at my office, in Utica, this 19th day of May, 1868.

[L. S.] A. A. BOYCE, *Clerk.*

UNITED STATES OF AMERICA,
Northern District of New York,
City and County of Albany, ss:

Be it remembered, that on this 12th day of June, in the year of our Lord one thousand eight hundred and sixty-eight, I, Worthington Frothingham, a commissioner, duly appointed by the circuit court of the United States, for the northern district of New York, in the second circuit, under and in pursuance of the laws of the United States, and pursuant to an order, of which a copy is hereto annexed, did call and cause to be and personally appear before me, at my office, at number 69 State street, in the city of Albany, in the northern district of New York, Dennis G. Littlefield, to testify and the truth to say, on the part and behalf of the complainants, in a certain suit or matter of controversy now
64 depending and undetermined, in the circuit court of the United States, for the northern district of New York, wherein William Hailes and Ellen T. Treadwell are complainants, and Jasper Van Wormer and Michael McGarvey and others are defendants, and the examination of the said witness having been adjourned until this second day of July, 1868. And the said Dennis G. Littlefield, being about the age of 51 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Dennis G. Littlefield, and he did thereupon depose, testify, and say as follows, viz, upon interrogatories proposed, respectively, by Joel Tiffany, esq., counsel for complainants, Charles M. Keller, esq., counsel for defendants.

The complainants hereupon produce in evidence a stove admitted by defendants' counsel to be a stove manufactured by defendants, and which is marked by the commissioner, "Complainants' Exhibit A."

Also letters-patent, re-issue number 1397, marked "Complainants' Exhibit B."

Also letters-patent, number 39535, marked "Complainants' Exhibit C."

65 The said DENNIS G. LITTLEFIELD, having been sworn as aforesaid, testified as follows:

Q. Please state your name, age, residence, and occuption.

A. My name is Dennis G. Littlefield; age, 51 years; residence, Albany, N. Y. My occupation is an inventor and manufacturer of base-burning stoves.

Q. Please state how many years you have been engaged in inventing and improving stoves, and how many years you have been engaged in the business of manufacturing base-burning stoves.

A. Since 1853—from that time to 1862, in connection with certain parties acting as licensees, who manufactured, under my patents, from 1862 to 1865, being a member of a firm manufacturing such stoves;
66 from 1865 to the present time as one of the Littlefield Stove Manufacturing Company, who are and have been engaged in manufacturing such stoves.

Q. Please state whether you are acquainted with the organization and

construction of a base-burning stove, manufactured by defendants, and marked "Complainants' Exhibit A."

A. I am acquainted with said stove, and understand the principles of its organization and construction.

Q. Please examine letters-patent, marked "Complainants' Exhibit B," and state in what respect, if any, the principles involved in the organization and construction of the stove, marked "Complainants' Exhibit A," are identical with those involved in the claims 1, 2, 4, and 5, of the patent marked "Exhibit B."

A. I have examined said patent, and find it infringes the first claim by using a coal-supply reservoir in combination with the place where the fuel is burned, with the stove so constructed that the products of combustion do not pass up above the supply-reservoir, but down outside of the fire-pot towards the base of the stove, and out through a main draught-flue; and that it infringes the third claim by using a fire-pot resting on a base, and imperforated and so constructed and applied in respect to the coal-supply reservoir, that an inclosed horizontal chamber, for the free expansion and circulation of the flame and gases, is formed all around and above the upper edge of the fire-pot; and it infringes the fourth claim by using a descending passage in combination with the continuous flame expansion and circulating passage, and a main draught-flue leading out of the base or lower part of the stove; and it infringes the fifth claim by constructing a fire-pot with an imperforated circumference and in form of a trumpet-mouth at its upper portion, in combination with descending flame-passages to the base; and it infringes the second claim by contracting the discharge-end of the coal-supply reservoir, and expanding of the fire-pot and extending the flame-passage downward for united operation in a base-burning coal-supply reservoir-stove.

Q. Please state the effect of contracting the mouth of the supply-cylinder and expanding the upper edge of the fire-pot upon the increase of the burning surface of the solid fuel.

A. It has the effect to increase the surface of the radiation from the ignited fuel.

67 Q. What effect also has the contraction of the mouth of the supply-cylinder other than as you have described?

A. It has the effect to prevent the coal from crowding too heavily down into fire-pot; also to increase the capacity of the flame-expansion chamber formed above the upper periphery of the fire-pot.

Q. Please state the advantage resulting from conducting the products of combustion into the base of the stove, and thence out into the exit-flue.

A. It has the advantage of heating up the lower part of the stove, and in an increased heating-surface of the whole stove.

Q. Please examine complainants' Exhibit C, and particularly the first and second claims, and state in what respect, if any, they are infringed by defendants' stove, Exhibit A.

A. I have examined said patent, and find it infringes the first claim by using in combination illumination-opening, flame-expansion chamber, coal-supply reservoir, fire-pot descending-flue, and draft-flue, substantially in the manner as claimed in said patent, and that it infringes the second claim by using in combination a flame-expansion chamber formed at the base of the coal-supply reservoir and around the upper edge of the fire-pot, and a branch draft-flue with damper located substantially in their combination with coal-supply reservoir as claimed in said patent.

(Signed) DENNIS G. LITTLEFIELD.

And I further certify that on the said second day of July, 1868, I did call and cause to be and personally appear before me at my office, at No. 69 State street, in the city of Albany, in the northern district of New York, James Gray, to testify and the truth to say, on the part and behalf of the complainants in said suit or matter of controversy, now depending and undetermined in the circuit court of the United States, for the northern district of New York, wherein William Hailes and Ellen T. Treadwell are complainants, and Jasper Van Wormer and Michael McGarvey and others are defendants.

And the said JAMES GRAY, being about the age of 47 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth in the matter of controversy aforesaid, I did carefully examine the said James Gray, and he did thereupon depose, testify, and say as follows, viz:

68 Q. Please state your name, age, residence, and occupation.

A. My name is James Gray; age, 47 years; residence, Albany. My occupation is a mechanic.

Q. What knowledge and experience have you had, if any, in the construction of stoves?

A. I have had twenty years' practical experience in making stoves, and am also a patentee in two base-burning stoves and furnaces.

Q. Please state if you are acquainted with the stove manufactured by the defendants, marked "Exhibit A," in this case, and understand the principles of its organization and construction.

A. I am so acquainted and understand the principles of its organization and construction.

Q. Please examine complainants' Exhibit B, and please state wherein said stove infringes claims 1, 2, 3, 4, and 5.

A. I find their stove a base-burning, coal-supply reservoir-stove, so constructed that the products of combustion do not pass above the coal-supply reservoir nor up through the grate, but down outside the fire-pot towards the base of the stove, and out through a main draft-flue which leads from the lower part of the stove, substantially as herein described. I find it conflicts with the second claim in the contraction of the discharge-end of the coal-supply reservoir, expanding of the fire-pot, and the extending of the flame-passage downward for united operation in a base-burning stove as herein set forth. I find it infringes in the third claim by having an imperforated fire-pot inclosed in a horizontal chamber for the free expansion and circulation of the flame and gases where the expansion and circulation of the flame and gases is formed all around and outside of the contracted discharge and above the upper edge of the fire-pot for the purposes set forth. In conflicts with the fourth claim, having descending passages in combination with the continuous flame-expansion and circulation-passage and the main draft-flue leading out of the same. It infringes the fifth claim in constructing the fire-pot in a base-burning coal-supply reservoir above, with an imperforated circumference, and in form of a trumpet-mouth at its upper portion in combination with descending flame-passages substantially as described for the purpose set forth.

Q. Please examine the first and second claims of Exhibit C, and state wherein said stove infringes upon said claims.

69 A. It infringes the first claim in the combination of the illumination-openings, flame-expansion chamber, coal-supply reservoir, fire-pot, descending flue and draft-flue, substantially in the manner and for the purposes described. It infringes the second claim in having a flame-expansion chamber formed at the base of the coal-supply reser-

, and around the upper edge of the fire-pot; also it has the branch t-flue with damper located with respect to the flame-expansion cham- fire-pot, coal-supply reservoir, and descending flue, substantially as for the purposes herein described.

(Signed) JAMES GRAY.

Complainants here introduced in evidence a drawing, which is ad- ed by defendants' counsel to be a true drawing of defendants' stove, ibit A, marked "Complainants' Exhibit D."

nd I further certify that the said exhibits marked A, B, C, and D, re- ively, were, by consent of counsel for said parties, delivered to said lainants' counsel, to be by him produced upon the trial of this ac-

d I further certify that the preceding depositions were reduced to g by me and signed separately by the said Dennis G. Littlefield ames Gray, in my presence, and that I am not of counsel or attor- or either of the parties of said suit, nor am I interested in the event of.

ted at Albany this second day of July, A. D. 1868.

(Signed) WORTHINGTON FROTHINGHAM,
United States Commissioner.

In the U. S. circuit court, northern district of New York.

LIAM HAILES AND ELLEN T. TREADWELL, complainants, *ag'st* ER VAN WORMER, MICHAEL MCGARVEY, am Mann, and Joseph C. Barnes, defend- } In equity.

t remembered that on the 7th day of October, one thousand eight d and sixty-eight, at the city of Albany, county of Albany, and State of New York, personally appeared the complainants above- named, by Joel Tiffany, esq., their solicitor and counsel, and also the defendants above-named, by their solicitor, J. C. McClure, d their counsel, Charles M. Keller, esq., and consent that the ny of the following witness, William Hailes, one of the com- nts, of the city of Albany, county of Albany, and State of New be taken before me, Amasa Parker, jr., a commissioner appointed the laws of the United States to take affidavits and acknowledg- of bail, &c., to be read in evidence on the part of the complainants hearing of the above-entitled cause.

the said WILLIAM HAILES, one of the complainants, appearing at e time, and being by me carefully examined and cautioned, and orn to testify the truth, the whole truth and nothing but the , saith:

(Here follow three diagrams, marked pages 48, 49, & 51.)

question. What is your name, age, residence, and occupation?

wer. My name is William Hailes; residence, Albany; age, 44 occupation, for 20 years last past I have been engaged in ma- d stove-pattern making; for the last ten years I have devoted to the planning, improving, and designing of stoves only. My lication for a patent for an improvement in stoves was made my last application was in 1868, during which time I have ap- and obtained, individually and jointly, about 12 or 14 patents, g directly or indirectly to stoves.

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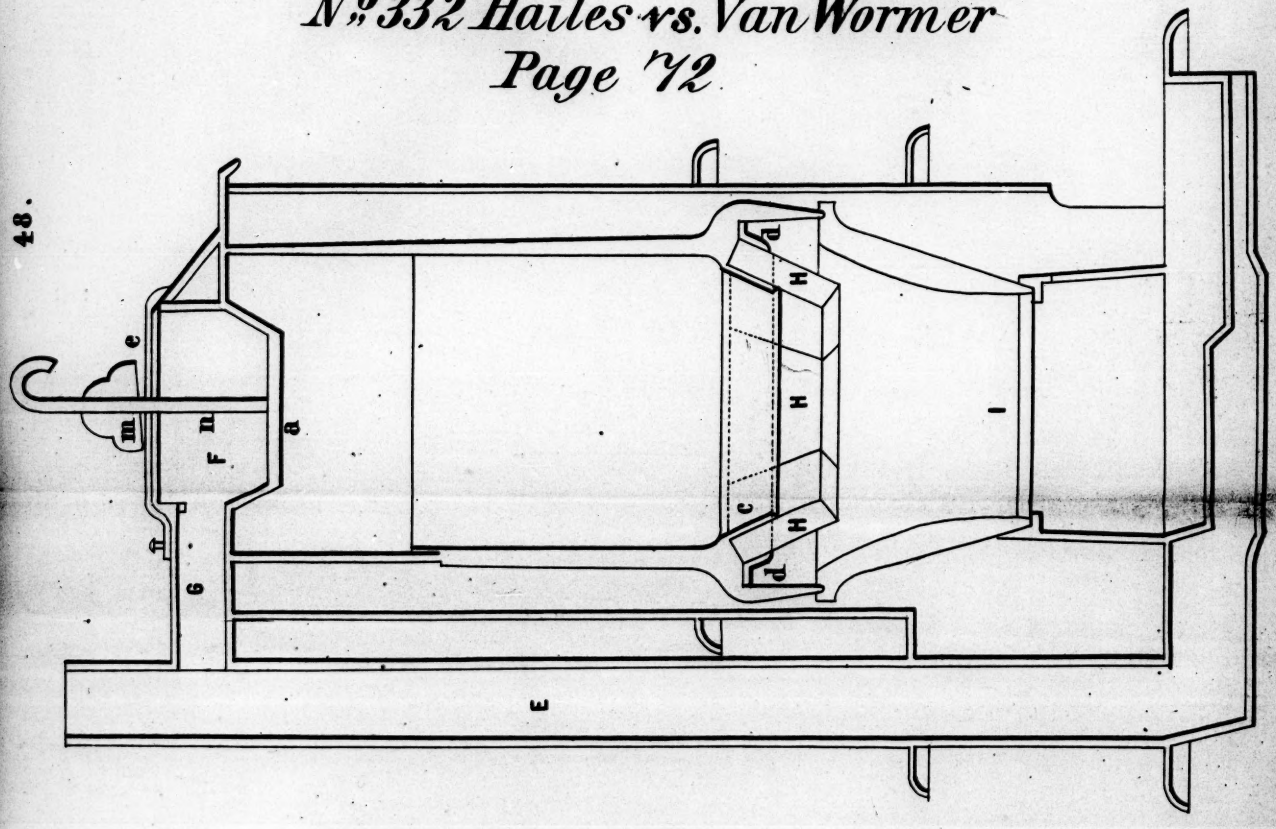
48.



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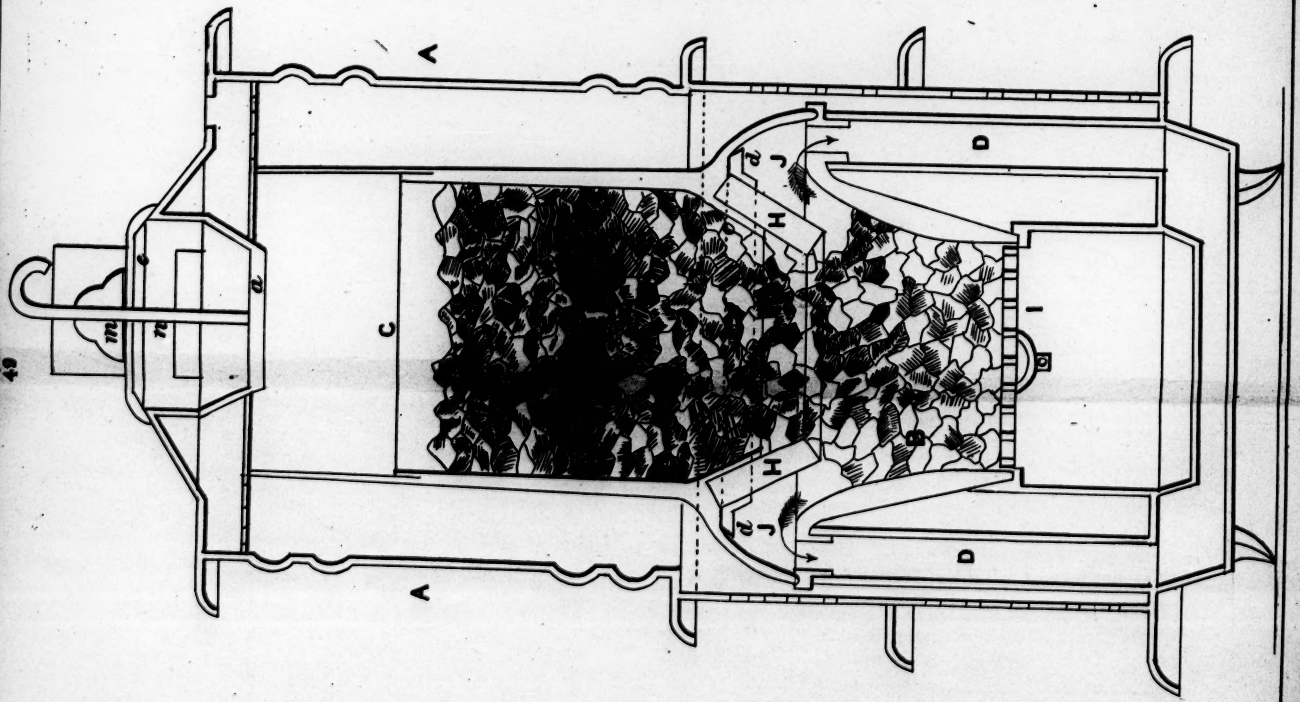

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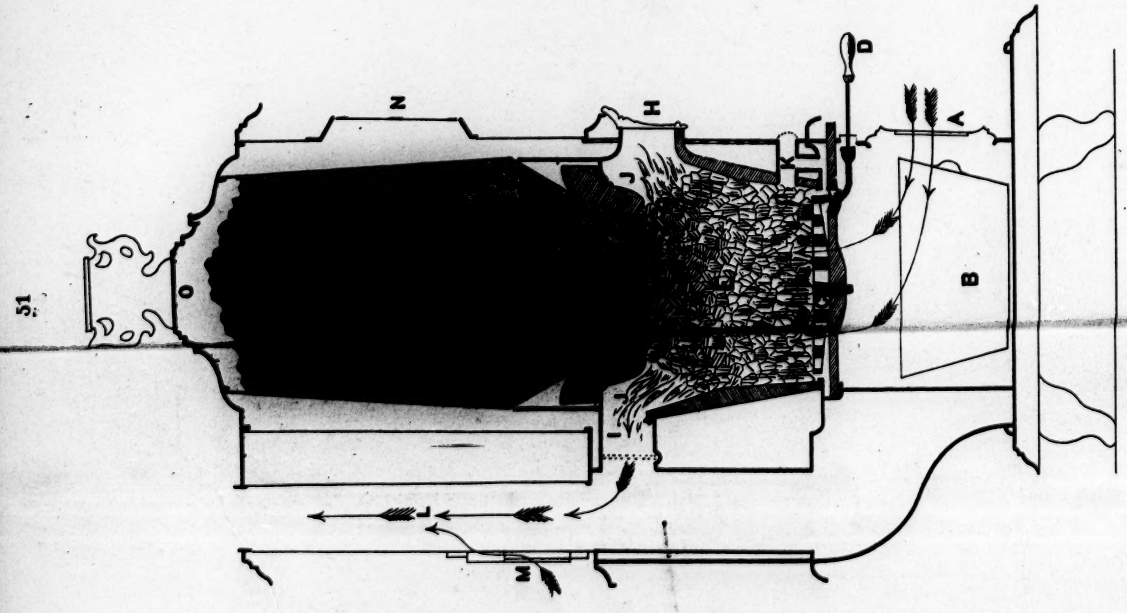


2d question. How long since you first became acquainted with base-burning stoves, and what, if anything, was the extent of your acquaintance with them prior to 1861?

Answer. In 1852, I believe, I became acquainted with a stove known by the name of the "Littlefield stove," or "Lowell gas-burner;" the "Lowell gas-burner" was a direct-draught flue stove. That stove had a perforated fire-pot, burnt out laterally into a chamber formed by the outer jacket and the feeder; it burned upwards toward the top of the stove to the exit-pipe, thence to the chimney; I was acquainted with some of the defects of that stove. The next stove with which I became acquainted was called the "Railway coal-burner," made under patents of Dennis G. Littlefield. This stove differed from the last one mentioned in some respects; it had an imperforated fire-pot, burnt out of a series of mouths or pipes, leading to the top of the stove, then to
71 the exit pipe, and thence to the chimney; it was surrounded by a perforated casing; this was an up-draught flue or direct flue like the former; was somewhat acquainted with its defects. Those were the only base-burning stoves I had an opportunity of seeing in operation prior to 1861, except seeing one of Dr. Nott's stoves in operation.

3d question. Have you made experiments, either by yourself or in conjunction with others, with base-burning stoves, and if so when did you first commence such experiments; what did you seek to accomplish, and what progress did you make in the accomplishment of your purpose?

Answer. I have made such experiments in conjunction with John G. Treadwell. Our first experiments were made in the winters of 1858 and 1859, out of which experiments grew the present stove, which is known and denominated the "Brilliant," manufactured by John F. Rathbone & Co. We sought to make a more powerful heating stove than had before been constructed, trying to remedy defects found in the two stoves above mentioned. We found in operating the Lowell gas-burner that the fire-pot and feeder were of the same size, therefore the column of coal pressed too heavily on the ignited fuel in the fire-pot. This defect we sought to remedy by enlarging the top of the fire-pot and contracting the discharge end of the feeder, also disconnecting the feeder from the fire-pot, forming a combustion chamber all around the upper edge of the fire-pot and between the contracted discharge end of the feeder. We sought to improve its heating qualities by passing the products of combustion down outside of the fire-pot into the base of the stove; thence around or under the bottom into a chamber or space leading out into the exit pipe; thence to the chimney and in the rear of the stove. We had conducted our experiments so far that in March, 1861, we made an application for a patent for the same. Having embodied those ideas into a stove named the "Ci adel," which was manufactured and sold by the firm of Treadwells, Perry & Norton. This was prior to 1861. The "Citadel" was made in the fall of 1860 and in the winter of 1860 and 1861. This stove was made according to the drawings, as near as may be, in the patent of May 7, 1861. This stove was defective in its operation. We prosecuted our experiment still further to remedy those defects. We had difficulty with the stove leaking gas; we admitted air to the combustion chamber to remedy that evil. It was still de-
74 fective. We next embodied our ideas in a stove for the public, which we called the "Excelsior," and it was manufactured by John F. Rathbone, of Albany, and Jewett & Root, of Buffalo. The "Excelsior" was first manufactured in 1872, that is the fall of 1862. This stove operated better than the "Citadel;" there were still objections to it. To remedy the defects in the "Citadel" we made the fire-pot in

the "Excelsior" more shallow, and instead of passing the products under the ash pit, we passed them on each side to the back; we also illuminated the flame chamber. We also converted this stove, the "Excelsior," into a double heater, and added a double top for heating chambers above where the stove was situated; we also removed the cross pipe from the top of the stove to the combustion chamber below, thereby making a direct draught from the combustion chamber to the exit pipe, controlled by a damper. We found in the operation of the "Citadel" that it was difficult in sluggish draughts to kindle a fire. We found it necessary to make a more direct way to the chimney to be used only for kindling a fire or for reviving the same when very low. We sought to secure these improvements with others by re-issuing our former patent and making another application for a patent, which was granted in August, 1863. (Exhibit C.) This stove did not altogether meet the demands; it was too heavy, and other defects, thereby making it too expensive, in consequence of making every stove a double heater, which we sought to remedy in a stove called the "Brilliant," which we arranged and submitted to John F. Rathbone in the fall of 1865, for the purpose of inducing him to make new patterns. We could not agree with Mr. Rathbone about the expense attending these patterns, he wishing us to pay two-thirds of the cost, which we were not disposed to do. This arose from the fact that our patents, that is the right of sale under them, were cut up into three sections—one west, one south, and one east—Mr. Rathbone having the eastern section; Jewett & Root, of Buffalo, having the western section; and we retaining the southern ourselves. The expense attending our former patterns being divided into thirds, we therefore did not embody these ideas into another stove until the spring of 1867, when we brought out a new one called the "Brilliant." We make two forms of the "Brilliant," one we call a double heater, the other a single heater, thereby obviating the expense spoken of in the "Excelsior."

76 4th question. What do you mean by saying you sought to secure certain improvements by re-issuing your patent of 1861?

Answer. I mean we sought to secure additional improvements by making an application for new letters-patent, and re-issuing our 1861 patent, to remedy defects therein. The Patent-Office, for some reason or other, absolutely refused to give us in 1861, what we represented in our application and asked for in our petition, which we afterwards obtained by re-issue.

5th question. What were the principal features of your improvement in base-burning stoves, sought to be secured in 1861, which were continued in all your subsequent efforts at perfecting a base-burning stove?

Answer. Detaching the feeder from the fire-pot, contracting the discharge end of the feeder, enlarging the top of the fire-pot, thereby forming a chamber which we term "combustion chamber," or "flame expansion chamber," and extending the flame passage down into the base of the stove, thence to the exit-pipe, causing the products of combustion to pass down through the base of the stove to the exit-flue.

6th question. What additional improvements did you make during these experiments after the patent of 1861, which you sought to secure by additional letters-patent, and what led to these improvements?

Answer. Our first additional improvement consisted in showing the illuminator in the flame expansion chamber, to make a more cheerful and marketable stove. We also found that the imperfect fittings of the mica frames admitted sufficient air to the flame expansion chamber to

produce more perfect combustion, thereby obviating the necessity of making special provision for the admission of air to the flame expansion chamber, by drilling holes through the outer casing of the flame expansion chamber. Our next improvement consisted in making a detachable throat to the feeder, composed of fire-brick and iron, for the purpose of making it more durable, it being exposed to a very intense heat, also preventing it from tearing itself to pieces by expansion and contraction, also facilitating the repairing of the same. Our next improvement consisted in placing the direct draught at or near the top of the fire-pot, controlling the same by a damper for the purposes before stated. There were other improvements not in controversy in this case, not
77 necessary to name. There is an additional feature of improvement embodied in our first patent which I omitted to mention in my answer to the last preceding question, which is, we did not pass the products of combustion up around and over the feeder, as is the case with former base-burning stoves. We had two objects in view in not so passing the products of combustion: the first to avoid intensely heating the feeder, thereby communicating the heat to the reserved coal in the feeder and converting it into gas, thereby causing explosion into the room when the cover was removed. Our second object was to carry the heat to the floor, for the purpose of heating the bottom or base of the stove and floor, retaining the heat much longer, making it more economical than in that class of stove where the products of combustion passed up and over the feeder to the exit-flue.

7th question. In making the several base-burning stoves by you above stated, what were you seeking mainly to accomplish?

Answer. A more powerful heater, a more economical burner, and a more desirable appearing stove.

8th question. From your practical experience, what difficulties did you find attending the pressure of the mass of coal in the feeder upon the ignited fuel on the grate in the fire-pot?

Answer. We found that the charge of coal in the feeder rested too heavily on the ignited fuel in the fire-pot, especially when shaking the grate, when we wished to relieve it, it having a strong tendency at that time to compact the coal and prevent the air passing in at the grate through the coal to the flame expansion chamber.

9th question. What effect had the contracting of the bottom of the feeder and the enlarging of the top of the fire-pot upon this tendency to compact the coal in the fire-pot, as above stated?

Answer. It remedied the evil of compacting the coal in the fire-pot, at the same time giving us a larger surface of fire, and, in connection with the enlarged fire-pot, gave us a flame expansion chamber.

10th question. Have you practically experienced any difficulty arising from the enlargement of the top of the fire-pot, or from the contracting of the bottom of the feeder, or from both combined?

78 Answer. I have never found any difficulty arising from the enlarging of the top of the fire-pot; when the contraction in the mouth of the feeder is made too abrupt or too small, I have found some difficulty in feeding the fuel to the fire, arising from the clogging or choking of the coal, especially when the coal is too large. We have modified that form of contracting too abruptly, as shown in the "Brilliant," and adopted a form and size of throat, and have had no difficulty since in that respect.

11th question. Practically, have you experienced any difficulty arising from the formation of clinkers, in consequence of the flaring of the top of the fire-pot?

Answer. Not the least from that cause; I have experienced difficu
om the formation of clinkers both in the "Citadel" and the "Exc
or," but it arose from the fire-pot being too much co
ulted in the fire-pot at one time; since reducing the depth of t
e-pot in 1862, we have had no difficulty from that cause.

12th question. You say that from the commencement of your experi
ents with base-burning stoves, you have endeavored to apply the
rinciple of a feeder to revertible flue stoves; please state what you
ean by the term revertible flue stove.

(Objected to by defendants' counsel.)

Answer. I mean in that class of stoves where the products of combus-
on are passed down by means of flues, inside of the body of the stove,
to the base of the stove on the way to the exit-pipe and chimney.

13th question. What distinction, if any, is there between a revertible
e stove, and a stove having a revertible draught-pipe outside of the
ove itself?

Answer. I understand a stove having a revertible draught is one
ere the products of combustion, after leaving the stove, descend in a
e or pipes on the outside of the body of the stove, and is not con-
ted with the base or double bottom.

Cross-examination:

st question. Are you acquainted with a stove known as the "Orm-
d" stove?

nswer. I am not; I never saw it to my knowledge.

2d question. Do you mean to include in your definition of a stove having a revertible draught, stoves which are constructed, with a cylinder containing the fire-pot and two smaller cylinders, on each side, connected with a central cylinder near the top, the side cylinders having each a central partition, the products of com-tion passing from the central cylinder, on each side, into the two cylinders, down on one side of the partitions to the bottom near floor; then up the other side of the partitions to a cross flue con-ing the two outside cylinders, and thence to the exit-pipe?

nswer. I should include such a stove.

question. Look at the diagram on page 26, in a pamphlet entitled istory of the improvements applicable to the base-burning or hori-l-draught stoves," published at Albany, in 1859, which is marked bit 18 *b*, and state whether that is the second of the Littlefield burning stoves referred to in your testimony-in-chief.

swer. It is.

question. Do you not know that explosions have taken place in the rs of some of your stoves called the "Brilliant?"

swer. I do.

Re-direct examination:

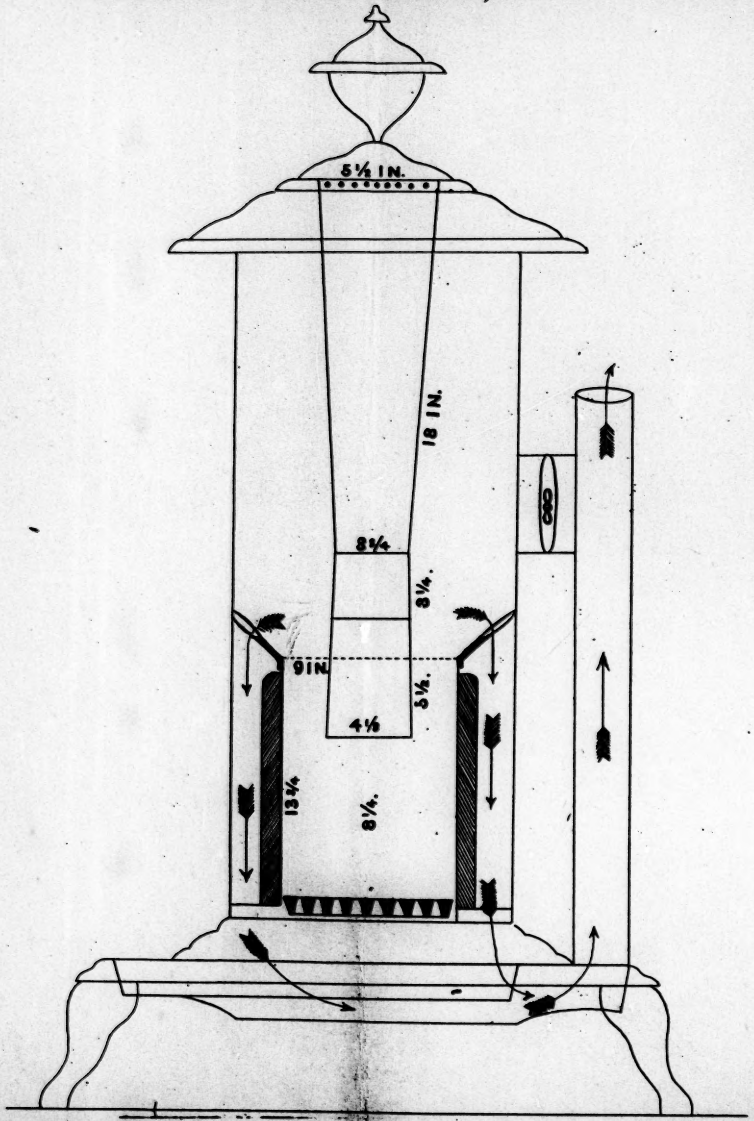
question. Have you remedied that difficulty; and if so, when, and reat was that difficulty in the "Brilliant" to be remedied?

wer. We have remedied that difficulty, in the fall of 1867, by plac-lower part of the feeder in communication with the combustion er, as represented by arrows passing through the feeder, in Exhibit of complainants. This difficulty only occurred in certain locali-here the coal was used without screening. The firm sold about in 1867; we had perhaps about fifty complaints.

question. Do you know how many of the "Brilliant" stoves have t into market during the present year—that is, up to this time?

wer. I do not know exactly the number, but the firm of Rathbone

American Gas Burner, with the Sheetiron feeder, as put in by defendants, Van Wormer & Mc. Garvey, in the winter of 1857, 1858, and used more or less for exhibition, &c.

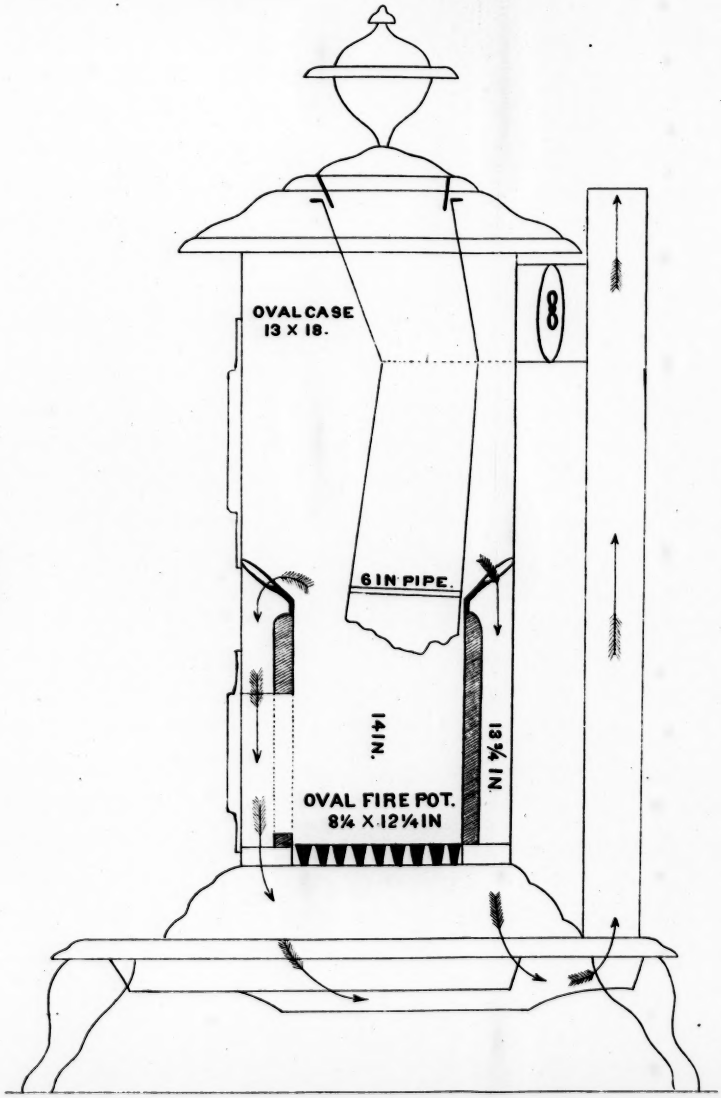


15

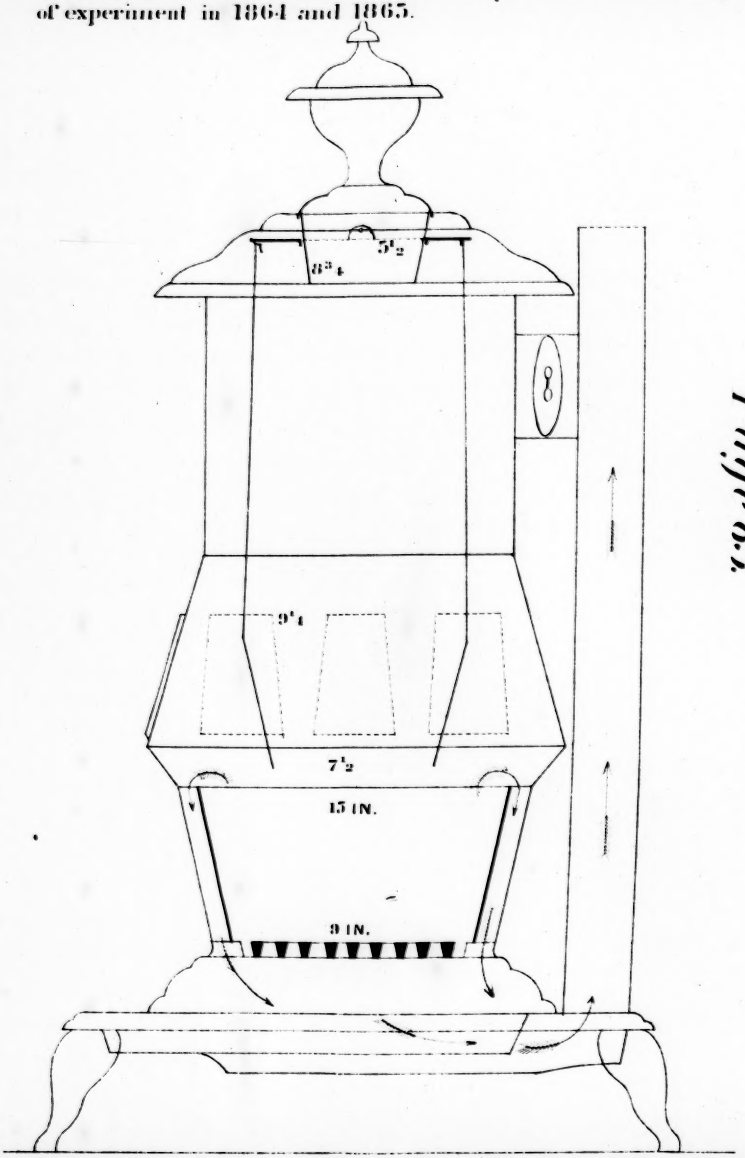
No. 832 Hailes vs. Van Wormer
Page 81.

American Gas Burner, with Sheetiron feeder, as altered and used by way of experiment in 1861, 1862, by defendants, Van Wormer & Mc Garvey.

No 332 Hailes vs. Van Wormer
Page 82.

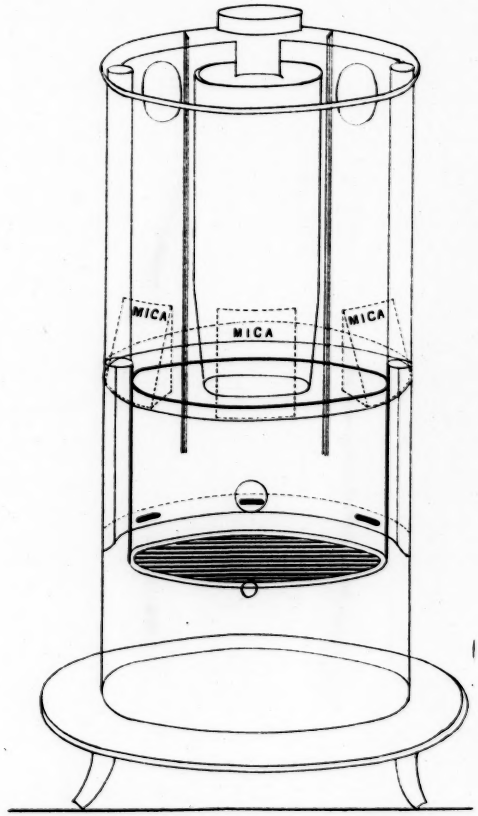


Defendants, Van Wormer & Mc Garvey's stove, as made by way of experiment in 1864 and 1865.



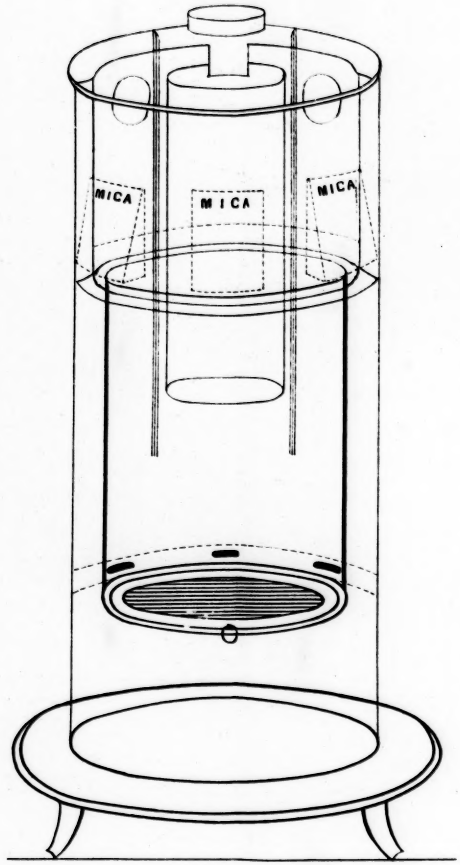
Vs. 229 Hollis vs. Van Wormer.
Page 82

Representation of the model of the Sanford stove, as altered near the close of examination of defendants witnesses



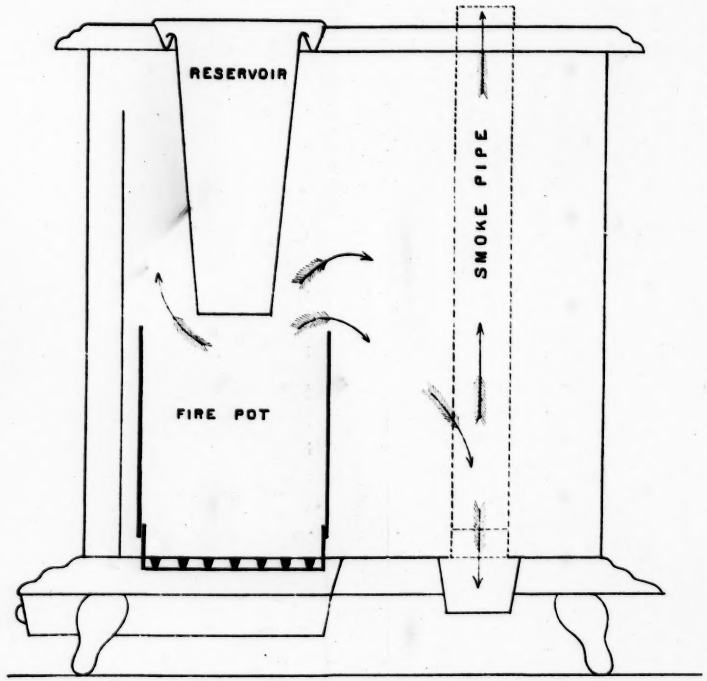
No. 332. Hailes vs. Van Warmer.
Page 84.

Representation of the model of the Sanford stove, as first presented by Sanford.



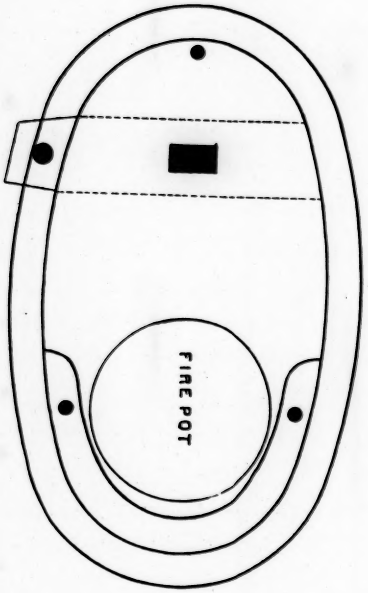
No. 2332. Hailes vs. Van Wormer. Page 85.

Vertical Section of the Mc Gregor stove. Defendants exhibit, 8, b.

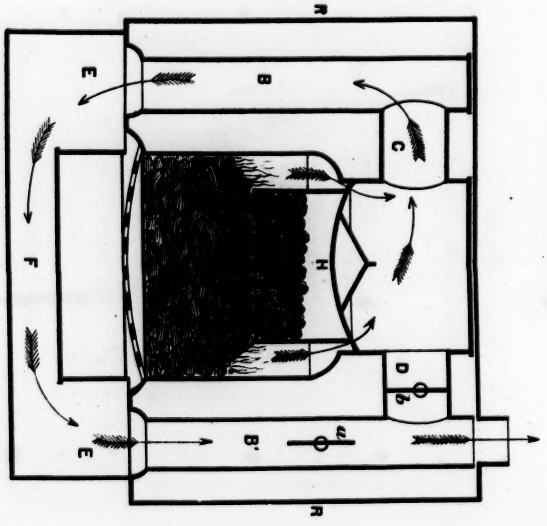


No. 332. Hailes vs. Van Wormer.
Page 86.

Horizontal section at the base of the Mc Gregor stove.
Defendants exhibit, 8, b.



Nº 332.- Hailes - vs. - Van Wormer.
Page 88.



64

The Sexton Stove.

& Co. have already shipped about seven thousand. These all co
our remedy for the prevention of explosions.

80 16th question. According to your experience in the use of
burning stoves, if clogging or choking takes place in the f
about how high above the mouth of the feeder does this take plac
Answer. About six inches from the lower or discharge end; co
tion of the fuel usually takes place from five to six inches abov
lower end of the feed cylinder, thereby relieving itself from chokin
low that point.

Re-cross examination:

5th question. Look at Exhibit "D," and state whether that repre
the form of the feeder in the "Brilliant," constructed during the
1867?

Answer. It is a fair representation, since applying the remedy th
for the prevention of explosions.

WILLIAM HAIL

And I do further certify that the preceding deposition was reduc
writing by me, and signed by the said William Hailes in my pres
and that I am not of counsel or attorney for either of the parties to
said suit, nor am I interested in the event thereof.

AMASA J. PARKER, J'R,
United States Commissioner for N. D. of N. Y., Albany, New Yor

(Here follow eight diagrams marked pages 81, 82, 83, 84, 85, 86, 87 &

89 United States circuit court, northern district of New York.

WILLIAM HAILES AND ELLEN TREADWELL
against
JASPER VAN WORMER, MICHAEL MCGARVEY, Abraham Mann, and Joseph C. Barnes. } In equity.

Testimony taken on the part of the above-named defendants before me, W'm H. Bishop, a notary public for the city and county of New York, State of New York, by consent of counsel for the respective parties, under the 67th rule of the Supreme Court of the United States, in equity.

SEPTEMBER 11TH, 1868.

Present, J. Tiffany, esq., counsel for complainants, and Charles M. Keller, esq., counsel for defendants.

MICHAEL BULGER, a witness produced on the part of the defendants, and being duly sworn, testifies as follows:

Q. 1. What is your name, age, residence, and occupation?

A. Michael Bulger; about 42 years of age; Albany, N. Y.; provision dealer and grocer.

Q. 2. Were you ever in the employ of Van Wormer & McGarvey, stove manufacturers in Albany, and if yea, state from what time to what time you were in their employ?

A. Yes, sir; from the fall of 1853 to June, 1859.

Q. 3. Have you any recollection of a reservoir stove being made and used in that establishment while you were in their employ?

A. Yes, sir; that stove; (witness points to stove marked "Defendants' Exhibit No. 1.")

90 Q. 4. When was that stove first made and seen by you?

A. The feeder or cone was made, I think, in the latter part of the year 1857.

Q. 5. Irrespective of the cone, were stoves like that made and sold by Van Wormer & McGarvey while you were there?

A. They were; I cannot swear that Exhibit 1 was made at that time, but stoves like that were made. The cone is the identical cone then in use.

Q. 6. Was the stove like Exhibit 1 with the cone in, Exhibit 1, used with coal at any time while you were there; and if yea, state during what periods of time?

A. Yes, sir. I think it was in the latter part of 1857 and the early part of 1858.

Q. 7. State how it operated?

A. I think it operated well enough to heat the office it was placed in; I never gave its operation much attention.

Q. 8. Where was it when you left the employment of Van Wormer & McGarvey, in June, 1859?

A. It was in the building. I cannot say where; the cone was placed up-stairs.

Q. 9. Was that stove, with the cone in it, ever shown to customers while you were there?

A. It was, sir.

(Signed) MICHAEL BULGER.

Subscribed and sworn to before me this 11th day of September, 1868.

[SEAL.] W'M H. BISHOP,

Notary Public and examiner by consent.

JOSEPH C. BARNES, one of the defendants, being duly sworn, testifies as follows:

(Counsel for complainants excepts to the examination of this witness on the ground that he is one of the defendants in this case.)

Q. 1. What is your name, age, residence, and occupation?

91 A. Joseph C. Barnes; age 31 years; Albany, N. Y.; clerk.

Q. 2. Are you one of the defendants in this case?

A. Yes, sir.

Q. 3. You have stated that you are a clerk, and also that you are one of the defendants in this suit; state your exact relation to the establishment in which the stoves are made, and to Van Wormer & McGarvey?

A. I am a stockholder in the foundry; our foundry is a joint-stock concern. I am secretary of the company. I have no connection with Van Wormer & McGarvey, except as a clerk, under salary. The association is called The American Stove Company, and they make these and other stoves for Van Wormer & McGarvey. The defendants in this suit hold all the stock in the concern. Jasper Van Wormer and Michael McGarvey constitute the firm of Van Wormer & McGarvey.

Q. 4. When did you first become interested in that company?

A. In July, 1867.

Q. 5. Prior to that time did you have any interest in the business of manufacturing stoves with Van Wormer & McGarvey?

A. No, sir.

Q. 6. When did you first go into the employ of Van Wormer & McGarvey, and state in what capacity and how long you continued in their employ?

A. In August, 1856, as a clerk, and continue in their employ at the present time.

Q. 7. State whether as such clerk you had anything to do with the sales at the store?

A. Yes, sir; I did.

Q. 8. At the time you first went there in 1856, what kind of heating stoves did Van Wormer & McGarvey manufacture and sell?

A. Stoves similar to Exhibit 1, without the cone.

Q. 9. What were such stoves called at that time?

A. The American gas-burners.

Q. 10. Have you any recollection of a coal-feeder being applied to that class of stoves in the establishment of Van Wormer & McGarvey, and if yea, when first?

A. I have, in the winter of 1857 and 1858.

92 Q. 11. How was the feeder applied?

A. It was inserted through the top of the stove, the top of the feeder resting and supported by the top of the stove. The first one inserted was much more conical than the one in Exhibit 1. In feeding the coal it choked, would not feed down; the small end of the cone was then cut off and then another piece rivetted on the outside, making the mouth larger. Then we afterwards cut off a portion of that mouth and rivetted another piece on the outside of that, making the mouth flare outwards instead of inwards as before. This was done in the winter of 1857 and 1858, when we were experimenting. All the experiments were made of sheet-iron.

Q. 12. Do you know what has become of the feeder which was altered as stated in your last answer?

A. It is in Exhibit 1.

Q. 13. State how that stove operated after the feeder was altered as in Exhibit 1, and during what length of time it was used to your knowledge?

A. It operated well; it heated our office, and was in use for a month or six weeks; I cannot be positive in regard to the exact time.

Q. 14. Was it used at any time after the winter of 1857 and 1858?

A. It was not to my knowledge.

Q. 15. Was it at any time shown and described to customers?

A. Frequently.

Q. 16. Was any other feeder-stove made afterwards at Van Wormer & McGarvey's, and if so, when?

A. Yes, sir; in the winter of 1861 and 1862.

Q. 17. Is there any stove like that here?

A. Yes, the same stove is here. It is "Defendants' Exhibit No. 2."

Q. 18. Fix the time as near as you can when that stove, Exhibit No. 2, was first made.

A. It was made in the autumn of 1861, as soon as it was cold enough to put a stove up in the work-shop. It was the first stove put up in the shop.

Q. 19. How long was that stove, Exhibit 2, in use?

A. Through the winter of 1861 and 1862, the winter of 1862 and 1863, and the winter of 1863 and 1864. It operated well in some experiments and not well in others.

93 Q. 20. During what time were such experiments made?

A. It was during the whole time the stove was in use; that is, from time to time.

Q. 21. Describe what changes were made for such experiments.

A. The feeder was first put in the stove with an adjustable mouth-piece, in the winter of 1861 and 1862. In the winter of 1862 and 1863 we used a stationary brick mouth-piece. In the winter of 1863 and 1864

we put in a stationary sheet-iron month-piece, the same that is in now; and from time to time the shape of the feeder was altered.

Q. 22. Which of the three modifications you have stated were the best?

A. The first one worked well when it was first put in, but owing to it being sheet-iron it soon got out of shape. The last change worked the best.

Q. 23. Did the fire fail to burn in any of them?

A. It did not.

Q. 24. You have stated that the stove, "Exhibit 1," was not used, to your knowledge, after the winter of 1857 and 1858. Do you know whether it was at any time after that winter exhibited and explained to customers?

A. It was, frequently.

Q. 25. Between the winter of 1857 and 1858, and the fall of 1861, was anything said by Van Wormer & McGarvey, or either of them, as to what they intended to do on the subject of feeder-stoves, and if so, what?

(Complainants' counsel excepts to the above question as calling for the mere statements or declarations of defendants, unaccompanied with any acts to give significance to such statements.)

A. It was frequently talked over, and the advisability of altering stove, "Exhibit 1," to make a base-burning or feeder stove of it, was discussed. We frequently told customers we were getting up such a stove. I chalked it on the floor to show what it would be.

Q. 26. How did the construction which you so chalked on the floor differ from Exhibit 1?

A. It was as near like it as *near as* I could chalk it.

94 Q. 27. After Exhibit No. 2, was there any other stove with a feeder made by Van Wormer & McGarvey, and if so, when was it made, and can you produce it?

A. There was one made in the winter of 1864 and 1865, and is present and marked "Defendants' Exhibit No. 3."

Q. 28. Was that stove, Exhibit 3, used, and how did it operate?

A. It was used, and operated well.

Q. 29. Were other feeder-stoves made by them after Exhibit 3, and if so, when, and can you produce one?

A. There were. The first was made in the winter of 1866 and 1867, and others through the year 1867, and I produce one to be marked "Defendant's Exhibit No. 4."

Q. 30. Have the defendants made any change in the feeder of their stoves since 1867? and if yea, can you produce one of the said modifications?

A. They have; and "Defendants' Exhibit No. 5" is one of said modifications.

Q. 31. Which have you found to work the best in practice, the stove with a feeder like Exhibit 4, or with a feeder like Exhibit 5?

A. Like Exhibit 5.

And on his cross-examination by J. Tiffany, esq., counsel for complainants, he testifies as follows:

Q. 1. How many of the class of stoves put in as exhibits have been put in the market by the defendants, and when were they first put in the market?

A. None but Exhibits 4 and 5. Exhibit 4 was made and sold in 1867 and Exhibit 5 in 1868.

(Signed) J. C. BARNES.

Subscribed and sworn to before me this 11th day of September, 1868.
[SEAL] W. H. BISHOP,
Notary Public and Examiner by consent.

The further examination of witnesses is adjourned to 2 o'clock p. m. this day.

95 2 O'CLOCK P. M.—Parties met pursuant to adjournment.

Counsel for defendants puts in evidence a copy of the drawings and translation of the specification of a patent issued by the government of France to M. Walker, dated September 12, 1849, as published in the "Brevets d'Invention," 1854, vol. 16, page 267, and marked "Defendants' Exhibit No. 6*b*."

Also a copy of the specification and drawings attached to the patent granted by the government of Great Britain to W'm Harper and Thomas Walker, dated May 10, 1839, as published in the "Repertory of Patent Inventions," new series, vol. 13, 1840, London, and marked "Defendants' Exhibit No. 7*b*."

Also a certified copy of the letters-patent of the United States, granted to James McGregor, j'r, dated January 7th, 1846, No. 4350, and marked "Defendants' Exhibit No. 8*b*."

Also a certified copy of the letters-patent of the United States to S. B. Sexton, dated April 19th, 1859, No. 23716, and marked "Defendants' Exhibit No. 9*b*."

Also a certified copy of the re-issued letters-patent of the United States, granted to S. B. Sexton, December 3d, 1861, No. 1242, and marked "Defendants' Exhibit No. 10*b*."

Also a certified copy of letters-patent of the United States, granted to Joseph C. Henderson, dated May 29th, 1860, No. 28482, and marked "Defendants' Exhibit No. 11*b*."

Also a certified copy of the re-issued letters-patent, granted to Joseph C. Henderson, dated June 30th, 1863, No. 1506, and marked "Defendants' Exhibit No. 12*b*."

Also a certified copy of letters-patent of the United States, granted to Jasper Van Wormer and Michael McGarvey, dated May 1st, 1866, No. 54447, and marked "Defendants' Exhibit No. 13*b*."

JASPER VAN WORMER, one of the defendants, being duly sworn, testifies as follows:

(The same exception is made by the counsel for the complainants to the examination of this witness as in the case of the witness, J. C. Barnes.)

96 Q. 1. What is your name, age, residence, and occupation?

A. Jasper Van Wormer; age 46 years; Albany, N. Y.; manufacturer of and dealer in stoves; one of the defendants in this case.

Q. 2. State particularly when the first reservoir or feeder stove was constructed in your establishment, how it was constructed, and how it operated.

A. The first feeder-stove was constructed in the winter of 1857 and 1858, made just as Exhibit No. 1, and worked well.

Q. 3. How long before you applied the feeder to the stove, Exhibit No. 1, had you been manufacturing and selling stoves like Exhibit No. 1, without the feeder?

A. About two years, and it was called the American Gas-Burner.

Q. 4. How long was that stove, Exhibit No. 1, used by your firm with the feeder?

A. At least two months.

Q. 5. Why did you not use it longer?

A. It was used during the winter of 1857 and 1858 till towards spring, and then it was set one side.

Q. 6. Did you set it one side because it did not work successfully?

A. No.

Q. 7. Did you after that make any other feeder-stove; and, if so, when and what kind?

A. We made the second feeding-stove in the early part of the fall of 1861; that is Exhibit No. 2.

Q. 8. Prior to making the feeder for the stove Exhibit No 1, had you any prior knowledge of feeders?

A. Yes, sir.

Q. 9. As applied to what kind of stoves?

A. Straight-draught stoves.

Q. 10. Did the stove Exhibit No. 1 differ, and if so, in what respect, from the stoves named by you as straight-draught feeder-stoves?

A. It differed in throwing the fire out from under the feeder; that is, the products of combustion.

Q. 11. In what direction did the products of combustion then travel?

A. Up a rear pipe.

97 Q. 12. State in what respect, if any, yours differed from other prior feeder-stoves.

A. It differed in throwing the coal out from under the feeder, spreading it out all around, and taking the products of combustion from the surface of the fire and sending them to the base, then returning them up to the chimney through a rear pipe. The American Gas-Burner, to which we applied the feeder, being a revertible flue-stove, that is, having an annular flue-space extending all around between the fire-pot and the outer casing of the stove, so that the products of combustion, passing over the edge of the pot, would descend into the annular space to the base of the stove and thence to the exit-pipe.

Q. 13. In the American Gas-Burner, Exhibit No. 1, to which you applied the feeder, was there any means, and if so, what, by which you could produce a direct draught without passing through the annular flue-space extending down to the base?

A. Yes, sir; there was. It was a cross-pipe, with a damper.

Q. 14. What, if any, change did you have to make in Exhibit No. 1 to change it from the American Gas-Burner to a base-burning feeding stove?

A. We had to put a feeder in it.

Q. 15. How did Exhibit No. 2 differ from Exhibit No. 1?

A. The fire-chamber and case were oval instead of round. The feeder is placed a little back of the centre of the fire-pot. In Exhibit No. 2 we made an adjustable feeding mouth-piece, and the feeder, being placed nearer the back part of the fire-pot, spread the coal out around more in front of the feeder. The adjustable mouth-piece was made to raise and lower, that we could feed a greater or less amount of coal. The products of combustion were taken up and carried to the base of the stove in an annular flue between the fire-pot and outer casing, similar to Exhibit No. 1. It had also an illuminating door placed in the front part of the fire-pot; gratings were set up in the front part of the fire-pot to hold the coal so that the fire could be seen by looking through the illuminating door. The exit-flue and cross-pipe were similar to Exhibit No. 1. The feeder in Exhibit No. 2 was disconnected from the top of the stove.

98 Q. 16. For what purpose was the upper door in Exhibit No. 2?

A. For illumination, for fixing the fire, and moving the mouth-piece.

Q. 17. Did you ever, at any time, and if so, when, have any other apertures for illumination?

A. Yes, sir; they were made at the same time the stove was made, at the sides. The apertures are in the Exhibit now, having an ornament riveted over them. This ornament was put on the last year the stove was used, in the winter of 1863 and 1864.

Q. 18. How early within your experience have you known stoves to be made with apertures glazed with mica for the purpose of illumination?

A. At least thirty years.

Q. 19. State what, if any, changes were made in the feeder of the stove Exhibit No. 2, and when, and what they were.

A. The first construction had temporarily a piece of sheet-iron at the mouth of the feeder, so that it could be moved up or down; that remained in it but a little while, when we took it apart and put on a brick mouth-piece that was movable also. This was done in the fall of 1861. That was kept in use for about two winters. This brick mouth-piece was made of a clay furnace and got out of order, and we then substituted cylinder-brick, which was used in the winter of 1863 and 1864.

Q. 20. What were you engaged in outside of your general business, from the winter of 1857 and 1858 to the fall of 1861?

A. In experimenting; different kinds of experiments.

Q. 21. Experiments relating to what?

A. Experiments relating to gas-burning stoves, heaters, more or less under consideration feeder-stoves. We brought out during that time two different constructions of stoves. The oval one is here, marked Exhibit No. 2. We brought out a new gas-ring, and improved our round American Gas-Burner, remodeled it, and put in our new gas-ring. We brought out an oval American Gas-burning stove; got up a new heater; brought out a new stove called the "Zouave;" brought
99 out some tops and bases to make new plain cylinder stoves. The most of these new articles that were brought out were experimented with, alterations made, etc.

Q. 22. What, if anything, did you do in reference to Exhibit No. 1 between the time when you stopped using it, and the time when you made Exhibit No. 2?

A. The Exhibit No. 1 was frequently shown up to our customers, and explained by showing and telling them that we intended to put it in the American Gas-Burner or that class stove.

The further examination is adjourned to September 12th, 1868, at 10 o'clock a. m.

SEPTEMBER 12TH, 1868, 10 *o'clock a. m.*

Parties met pursuant to the above adjournment, and continued the examination of the witness, Jasper Van Wormer, as follows:

Q. 23. What other feeder-stoves did your firm get up after No. 2, and when?

A. We got up Exhibit No. 3 in the winter of 1864 and 1865.

Q. 24. How did that work?

A. It worked well.

Q. 25. Did you get up any other after that; and if so, when, and what was it?

A. Yes, sir; the stove marked Exhibit No. 4, in the winter of 1866 and 1867.

Q. 26. How did that work?

A. It worked well.

Q. 27. Did you make any change in that class of stoves after that; and if so, what, and when?

A. Yes, sir; we made a new feeder in the winter of 1867 and 1868, Exhibit No. 5.

Q. 28. State particularly in what respects the stove Exhibit No. 3 differed from the stoves, Exhibits No. 1 and No. 2.

A. It differed a little in shape, by flaring the body out a little at the point of combustion, and contracting in above that, then running straight to the cast-iron top. It had a cast-iron pot, made a little flaring. The feeder could be adjusted bodily up and down, the
100 return-flue at the base, and the exit-pipe, cross-pipe, and damper being just the same.

Q. 29. How, if in any respect, did Exhibit No. 4 differ from Exhibit No. 3?

A. It does not differ any, except in the ornamentation.

Q. 30. How did the feeder, Exhibit No. 5, differ from the feeder in the stove Exhibit No. 4?

A. It differs in making the lower section slightly flaring out at the bottom. The connection of the two sections are made by points slipping through notches, on the upper section; and, by turning the lower section, the pins pass around on an incline on the lower edge of the upper section, the upper section being larger than the lower, the object being to throw the mass of coal up out of the intense heat; the lower section flaring out at the bottom, making a free discharge of the coal, and no liability of choking at the mouth.

Q. 31. Which have you found to work the best in practice, the feeders constructed like Exhibit No. 5, or the one you used in Exhibit No. 4?

A. Exhibit No. 5 works the best.

The further examination of this witness is adjourned to September 23d, 1868, at half-past two o'clock p. m.

SEPTEMBER 23D, 1868, *half-past two o'clock p. m.*

Parties met pursuant to the above adjournment, and continued the examination of the witness, Jasper Van Wormer, as follows:

Q. 32. What experience have you had in the construction and management of stoves?

A. We have got up several different kinds of stoves; among them, gas-burning stoves, feeding stoves, heaters, and several small stoves.

Q. 33. How many years have you been engaged in the business of manufacturing stoves?

A. Twenty-one years as a manufacturer, and eight years as an apprentice and journeyman.

Q. 34. Prior to getting up the stove Exhibit No. 1, were you acquainted with base-burning stoves, in which the coal was supplied by a feeder?

A. Yes, sir.

101 Q. 35. Name such as you were acquainted with.

A. The first was the Nott feeding-stove, not the Exhibit No. 7; next the Mott stove, Exhibit No. 8; next the Jenks stove; the Lowell gas-burner, by Littlefield; and the Railway coal-burner.

Q. 36. What was your object in getting up the stove Exhibit No. 1?

A. To make a reservoir-stove of the American Gas-Burning stove.

Q. 37. Are you acquainted with complainants' patent, Exhibit B? and if yea, state in what respects the stoves manufactured by the defendants, prior to the commencement of this suit, are substantially like and substantially different from the stoves described in the said patent; and in what respects, if any, they both resemble prior stoves in evidence in this case. I mean by prior stoves, either actual or described.

A. I am acquainted with complainants' patent, Exhibit B. The feeding-stoves manufactured by the defendants, prior to the commencement of this suit, were like the complainants' patent Exhibit B in this, that they had a feeder and reservoir to hold the supply of coal placed over a fire-pot; they had descending and ascending passages; mica illumination. That is all the resemblance between the stoves and the Exhibit B. They differ in this, defendants' stove having a descending passage that encircles the fire-pot, being the space between the fire-pot and outer casing; in Exhibit B, the return-flue is in two arms that descend to the base, set separate, and out from the fire-pot, leaving all of the fire-pot exposed to the air in the room. Exhibit B has an annular flue, surrounding the mouth of the feeder, whilst in defendants' stove, Exhibit No. 4, the fire-pot is completely surrounded by the products of combustion in their descent to the base; and also in defendants' Exhibit No. 4 the combustion-chamber extends to the top of the stove, whilst in Exhibit B the combustion-chamber seems to be a mere flue surrounding the mouth of the feeder, to receive the products of combustion and conduct them to the two side descending flues. The feeder in Exhibit B is exposed to the air from the room, all but the contracted portion of the feeder at the bottom. Defendants' stove has the feeder all
102 placed within the fire-chamber or body of the stove, and surrounded by the products of combustion all around and over the top; it has a cross-pipe or direct draught leading from the combustion-chamber to the exit-pipe leading to the chimney. The upper end of the feeder in Exhibit B communicates with a chamber above, leading by a cross-pipe into the exit-pipe leading to the chimney, there being a damper between the upper end of the feeder and the chamber above, which, when opened, allows a direct draught through the feeder into the exit-pipe. Exhibit B and defendants' stove resemble the Nott fire-place stove, defendants' Exhibit No. 7, in the general features of the feeder, enlarged fire-pot, the fire-pot larger than the feeder, a combustion-chamber, descending passage, an exit-pipe, and mica-window. The Mott stove, Exhibit No. 8, resembles Exhibit B and defendants' stove in having a feeder, the contracted mouth, enlarged fire-pot, combustion-chamber surrounding the mouth of the feeder, and mica door opposite to the combustion-chamber. Exhibit B and the defendants' resemble the MacGregor stove, Exhibit No. 6, in a contracted feeder, enlarged fire-pot, descending passage, and exit-flue or pipe; and they also resemble Exhibit 9 in having a feeder contracted as described by the witness Sanford, enlarged fire-pot, the descending draught-flue leading to the exit-pipe, and mica windows in front of the combustion-chamber for illumination.

Q. 38. When in your last answer you used the expression "combustion-chamber," did you mean any part of the stove beyond the fire-pot containing the fuel; and if so, what part or parts?

A. Yes, sir; the part of the stove that is outside of the feeder and above the fire-pot.

Q. 39. In the patent Exhibit B is the annular space between the fire-

pot and the outer casing of the stove a flue-space for the passage of the products of combustion?

A. No, sir.

Q. 40. How is that in defendants' stove Exhibit No. 4?

A. It is a flue for the descending products of combustion.

Q. 41. Is the outer casing of the stove in the patent Exhibit B,
103 which surrounds the fire-pot, like the surrounding casing in defendants' Exhibit No. 4; and if different, in what respect, and for what purpose?

A. No, sir; it differs by having a perforated case in Exhibit B, for the purpose of admitting air to the outside of the fire-pot, while in the Exhibit No. 4 the case is imperforated to inclose the descending flue-space.

The further examination of this witness is adjourned to the 24th day of September, 1868, at 11 o'clock a. m.

SEPTEMBER 24TH, 1868, 11 *o'clock a. m.*

Parties met pursuant to the above adjournment and proceeded with the further examination of the witness, Jasper Van Wormer, as follows:

Q. 42. If you remove from the stove described in the patent Exhibit B, what is called therein an inclosed horizontal chamber and the descending flame-passages, and attempt to make fire in that stove, what would be the consequence?

A. It would not burn at all, except up through the feeder.

Q. 43. Those parts being removed, what would prevent the escape of the products of combustion into the room?

A. There would be nothing to prevent it.

Q. 44. Are you acquainted with the description and drawings in defendants' Exhibit No. 6*b*? and if yea, state what sort of fire-pot you find therein represented.

A. I am acquainted with the same; I find a flaring fire-pot.

Q. 45. Is its circumference perforated or imperforated?

A. Imperforated.

Q. 46. What is the direction of the products of combustion after they leave the fire-pot?

A. They descend to the base and then pass to an exit-pipe.

Q. 47. What incloses the fire-pot and the feeder in the stove described therein and represented?

A. The outer casing or wall of the stove.

104 Q. 48. Are you acquainted with the patent granted to Joseph C. Henderson, marked defendants' Exhibit No. 11*b*? and if yea, state what kind of stove you find therein and represented.

A. I am acquainted with the same, and find a feeding or reservoir stove.

Q. 49. What is the form of the reservoir?

A. It is smaller at the bottom than at the top, tapering.

Q. 50. What is the direction of the products of composition, after leaving the fire-pot, on their way to the exit-pipe?

A. They pass out of a chamber surrounding the mouth of the feeder, at or near the surface of the coal in the fire-pot, and they ascend to a small degree, and then descend and pass to the exit-pipe.

Q. 51. Are you acquainted with the specification and drawings of the English patent granted to William Harper and Thomas Walker, dated May 10th, 1839, and marked defendants' Exhibit No. 7*b*? and if yea, state what sort of stove you find therein and represented.

A. I am acquainted with the same. It is a feeding or reservoir stove.

Q. 52. What is the form of the fire-pot therein represented?

A. It is an enlarged pot, having the upper portion flaring, making a combustion-chamber surrounding the mouth of the feeder.

Q. 53. Are you acquainted with the letters-patent granted to S. B. Sexton, April 19th, 1859, marked defendants' Exhibit No. 9*b*? and if yea, state what kind of stove is therein described and represented.

A. I am acquainted with the same. It is a feeding or reservoir stove. It has an enlarged fire-pot, larger than the mouth of the feeder; descending passage from the combustion-chamber to the base; the ascending or exit-flue, with cross-pipe, connecting the combustion-chamber with the exit-pipe, the same having a damper therein, and mica windows illuminating the combustion-chamber.

Q. 54. Are you acquainted with the model Exhibit No. 6? and if so, state what are the leading features represented by it.

105 A. I am acquainted with the same. It is a feeding or reservoir-stove, the feeder being contracted at the discharge end by being tapering; an enlarged fire-pot; descending passage to the base, which has a horizontal flue leading to the exit-pipe.

Q. 55. Describe the features which are combined in defendants' Exhibit No. 1.

A. It is a feeding or reservoir stove, with the lower portion of the feeder smaller than the upper end; enlarged fire-pot; a combustion-chamber inclosed within the outer casing or wall of the stove; descending passage to the base, this descending passage being an open space between the outer casing and fire-pot, completely encircling the fire-pot; an exit pipe, with a cross-pipe connecting the combustion-chamber with the exit-pipe, the cross-pipe having a damper in it, and mica windows illuminating the combustion-chamber.

Q. 56. In the gas-burner stoves which you made and sold prior to making Exhibit No. 1, did the illuminating grating of the door bear the same or different relation to the fire-pot as it does in Exhibit No. 1?

A. It did bear the same relation.

Q. 57. For what purpose was the lower end of the feeder, in defendants' Exhibit No. 4, made smaller than the upper part?

A. For the purpose of being able to draw the pattern from the sand, to cast it easily, and having a loose mouth-piece that we might replace it without injuring other parts of the feeder.

And on his cross-examination by the counsel for the complainants, he testifies as follows:

Cross-examination:

Q. 1. What other heating stoves than the American Gas-Burner were you manufacturing in 1857 and 1858, at the time you were experimenting with Exhibit No. 1?

A. We were manufacturing the stove called the "Chief."

106 Q. 2. Was the stove "Chief" a direct or revertible flue stove?

A. Direct.

Q. 3. Did you attempt, in 1857 and 1858, to convert the "Chief" to a feeder-stove?

A. No, sir.

Q. 4. Did you make any other experiment with feeder-stoves than to put in the feeder-pipe in Exhibit No. 1?

A. No, sir; not in 1857 and 1858.

Q. 5. How near to the grate does the feeder-pipe in Exhibit No. 1 extend, and how far below the top of the fire-pot?

A. It extends to within nine inches of the grate, and four inches and a half below the top of the fire-pot. The fire-pot extends no higher than at the point where the gas-ring begins to diverge.

Q. 6. Was such the position of the mouth of the feeder when you experimented with it in 1857 and 1858?

A. I think it was.

Q. 7. How far below the top of the fire-pot was the surface of the burning-fuel at the time of those experiments?

A. Between four and five inches.

Q. 8. Were the experiments made by you at that time satisfactory?

A. Yes, sir.

Q. 9. Did the fire-pot, at the surface of the burning-fuel, flare out or enlarge the combustion-chamber?

A. No, sir.

Q. 10. Did the flame ordinarily rise to the top of the fire-pot in those experiments?

A. Yes, sir; up above, into the chamber above the gas-ring.

Q. 11. The experiment being satisfactory, why was the stove, as a feeding one, laid aside for two years or more?

A. We set it aside temporarily for the purpose of getting out a larger assortment of stoves; some of a cheaper class heating-stoves, and a portable heater, which we needed very much, we having only the agency of Sanford's heater, in which we were limited to Albany County, and we very much wanted a heater of our own to put on the market.

107 Q. 12. What stove did you use in the place of this in the latter part of the winter of 1858?

A. I could not say particularly. It might have been a plain cylinder.

Q. 13. What alterations did you make in the feeder-stove with which you experimented in the fall of 1861 and winter of 1862?

A. We made first a temporary movable slide at the end of the feeder; then put in the adjustable brick mouth-piece; the mouth of the feeder I should judge to have been within nine inches of the grate and two inches below the top of the fire-pot; there was also a grate in Exhibit No. 2, in the front lower part of the fire-pot.

Q. 14. Did this experiment work equally well with that made with Exhibit No. 1?

A. Yes, sir; do not know that it did any better.

Q. 15. Did you ever after resort to experiments No. 1 and No. 2, or were they dismissed forever?

A. They were dismissed, and a new one taken up.

Q. 16. If experiment No. 1 was satisfactory, why did you not adopt it?

A. We were having a large sale of our gas-burner stoves, and we felt the need of other cheaper class heating-stoves, and this portable heater.

Q. 17. Why did you not adopt it in the fall of 1861, and winter of 1861 and 1862, instead of making further experiments with Exhibit No. 2?

A. Our capacity for making stoves was limited, having arrangements with a foundryman of Stamford, Connecticut, that we could only have a certain portion of the capacity of his foundry, and we were selling all we could get made of the then patterns.

Q. 18. Was the above the only reason for changing the form of your experimental stove from that of 1857 and 1858?

A. We brought out an oval stove between Exhibit No. 1 and Exhibit No. 2, and wished to try the feeder to that shape.

Q. 19. Then did you never try to apply the feeder to your American Gas-Burner after 1857 and 1858; and if so, when?

A. Yes, sir. In the winter of 1858 and 1859 we temporarily
108 put it in use by setting this feeder in No. 1 in a like stove in our office, to show to customers, but in no other way; we had the stove standing around our loft, and do not remember of using it afterwards; during this time it was not neglected, but we were showing it to customers.

Q. 20. When did you determine to abandon the application of a feeder to Gas-Burner, Exhibit No. 1?

A. We gave that up when we commenced our new one, in the fall of 1861. In saying abandoned, I do not mean to say we gave up the idea, but simply set it aside to go on with the oval stove.

Q. 21. Have you, since the fall and winter of 1861 and 1862, attempted to apply a feeder to the same style of stove represented by Exhibit No. 1; and if yea, when, and where is the stove?

A. I do not know what you mean by style, and therefore cannot say.

Q. 22. I mean by style, stoves called the American Gas-Burner, as made and sold by you in 1857 and 1858, and as represented in form and shape by Exhibit No. 1, removing therefrom the feeder.

A. Not to that style, but to that principle. Stove Exhibit No. 3 is the one; also Exhibit No. 2 represents the same in principle.

Q. 23. Have you ever attempted to apply a feeder to any oval stove like Exhibit No. 2, except Exhibit No. 2?

A. No.

Q. 24. In preparing and applying a feeder to Exhibit No. 2, were you seeking to remedy any defects in the operation of the stove Exhibit No. 1?

A. No, sir. We desired to make a slight change to throw the fire more in front of the feeder, or spreading it more; also, the idea of making a movable mouth-piece. That was all.

Q. 25. Did not the feeder in Exhibit No. 1 answer such purpose satisfactorily?

A. The feeder in Exhibit No. 1 was satisfactory, but we wished to make a little change, by throwing the fire in front—spreading the fire more in front of the feeder than at the back.

Q. 26. What led you to make the experiments in stove' Exhibit No. 3, No. 1, and No. 2, each being satisfactory?

109 A. A desire to get a little different shape to our stove, and to enlarge the fire-pot to gain more surface. This was in the winter of 1864 and 1865.

Q. 27. Would such an increase of fire-surface be an advantage in a base-burning stove, in your opinion?

A. Yes, sir; decidedly.

Q. 28. Did you learn this fact by your experiments with Exhibit No. 3?

A. We had that idea, and wished to bring it up. Our argument was, a surface throwing the fire out from under the feeder, and giving a large chamber for combustion.

Q. 29. How many stoves like Exhibit No. 3 did you make, and how long were you engaged in such experiments?

A. We made Exhibit No. 3 in the winter of 1864 and 1865, and kept it up till the winter of 1866 and 1867, two seasons. We made but one such stove.

Q. 30. Does Exhibit No. 4, in your opinion, carry out the idea

sought to be realized by experiments made with Exhibit No. 3, in increasing the burning surface of the solid fuel?

A. Yes, sir. It was my design to do so.

Q. 31. In your experiments with the American Gas-Burner, Exhibit No. 1, as a feeder-stove, did you discover a necessity for an adjustable feeder, afterwards attempted by you? If so, what was the indication of such necessity?

A. We found that, in the feeding-stoves then on the market with a fixed feeder, they were limited to just one depth of coal on the grate; also confined to one size of coal, usually a small coal. Complaints were made by parties using these stoves then on the market, that they were not able, in cold weather, to get heat enough out of them, and they being confined to one size of coal, when they would get out of it and could not use any other, for the reason that they could not get sufficient depth of the larger coal on the grate to support combustion. To meet that want we made the adjustable feeder, so that the depth of the fire could be increased, and also use larger coal.

The further cross-examination of this witness is adjourned to the 25th day of September, 1868, at 11 o'clock a. m.

110 SEPTEMBER 25TH, 1868, 11 *o'clock a. m.*

Parties met pursuant to the above adjournment and continued the cross-examination of the witness, Jasper Van Wormer, as follows:

Q. 32. What object had you in view in making the fire-pot in No. 3 flaring at the top?

A. To get more surface from under the feeder, to spread the coal more; to get the external shape of the case swelling out and then coming in more, having the extreme width coming out about on a line with the top of the pot, so that the fire-pot would have about the same angle as the outer case.

Q. 33. What object had you in view in giving such swelling out to the case?

A. I like that shape better.

Q. How long did you like it?

A. From that time to this. I do not know how much longer before that time.

Q. 35. Was the appearance in form the only reason for adopting that?

A. That, in connection with getting more surface from under the feeder.

Q. 36. What object had you in view in enlarging the mouth of the feeder by an outer ring attached thereto as in Exhibit No. 1, as stated by Mr. Barnes?

A. The first feeder was too small to feed well. We then cut off a section and rivetted on a piece, and then we cut off a section of that section and rivetted on another section. The object was to get a freer discharge of coal.

Q. 37. Were you at that time seeking to enlarge your fire-surface from under the feeder?

A. We were not.

Q. 38. In preparing stove, Exhibit No. 2, did you seek to make any other alterations than those pertaining to the oval shape of the stove; and if so, what alterations from Exhibit No. 1?

A. Yes, sir. We did make some alterations for the purpose of throwing the fire a little more in front than in the back of the feeder, and for testing the adjustable mouth-piece. That is all the purpose we had in

altering from No. 1 to No. 2, except that the lower door was intended solely for our oval American Gas-Burning stove.

111 Q. 39. How long did you continue to use or experiment with the stove, Exhibit No. 3, before you determined to make a stove similar to it for market?

A. We used it about two years, or until the winter of 1866 and 1867, but we concluded to make the stove and put it in market, soon after we put it in use.

Q. 40. Did you make any alterations in the construction of Exhibit No. 3 in getting up your stove, Exhibit No. 4, for market; and, if so, what alterations?

A. We made none.

Q. 41. What do you denominate your stove, Exhibit No. 4, as to the class or character of its flue or flues?

A. I denominate it as a class of stoves that return the fire to the base within the outer case or wall of the stove, one side of the fire-pot making one side of the flue, and the outer casing of the stove making the other side of the flue.

Q. 42. Do you call it a revertible or direct flue or draught stove?

A. Revertible.

Q. 43. Does the fact of its revertibility depend upon its having one or more downward draught flues?

A. No, sir; it can have one or a dozen.

Q. 44. Does the fact of its revertibility depend upon the mode of constructing the downward draught flues?

A. Not particularly.

Q. 45. How many downward flues or openings has stove No. 4 at or near the point of entering the base of the stove?

A. It has two general openings, with a check-plate, placed at the back part of the base, having three openings, I think.

Q. 46. What is the office of the check-plate with three openings?

A. To prevent a too direct draught to the exit-pipe. That class of stoves always has a check-plate to diffuse the draught.

Q. 47. Does stove, Exhibit No. 4, have a flaring fire-pot; that is, one larger at the top than at the base of the fire-pot?

A. Yes, sir.

Q. 48. Has the feeder in stove, Exhibit No. 4, a contracted discharge or mouth of feeder?

112 A. Yes, sir; just enough to be able to draw the patterns from the sand. The main body of the feeder is cylindrical, and made of sheet-iron, and is eight inches in diameter on the inside and eighteen inches in length. To the lower end of this is secured, by lap and rivet, a cast-iron ring with a conical flanch extending inward, the smallest inner diameter of which is seven inches and a quarter. The mouth-piece is a separate piece of cast iron having an outward projecting flanch, at the upper end, which, when the mouth-piece is inserted from the top, through the body of the reservoir, rests on the conical inward projection of this ring before described. The upper end of the mouth-piece forms a bevel of about forty-five degrees, and from the bottom of that bevel to the lower end the mouth-piece is four inches and one-eighth in length, the inner diameter at the base of the bevel (being the top of the mouth-piece) is scant six inches and three-quarters, and the lower end six inches and one-eighth.

Q. 49. What effect upon the extent of the fire-surface at the base of the feeder has this contraction of the mouth of the feeder?

A. It enlarges the fire-surface.

Q. 50. What effect upon the extent of the fire-surface at the mouth of the feeder would the enlarging or flaring of the top of the fire-pot in conjunction with the contraction of the mouth of the feeder have?

A. It would increase the fire-surface.

Q. 51. In stove, Exhibit No. 4, is the fire-surface at the mouth of the feeder enlarged at all by the means stated in the last question?

A. Yes, sir; it is.

Q. 52. In stove, Exhibit No. 4, is the chamber surrounding the mouth of the feeder enlarged or otherwise, by the expansion of the top of the fire-pot and the contraction of the mouth of the feeder?

A. In this stove the enlarging of the fire-pot and the contraction of the feeder-mouth would not have much effect upon increasing the chamber, because the casing forms the outer surface of the chamber; by enlarging the pot would take up of this chamber at a greater proportion than the contracting of the feeder.

Q. 53. Is there a chamber for the free expansion and circulation
113 of the flame and gases, above the top of the fire-pot and around the contracted mouth of the feeder, enclosed on the outside thereof by the sides of the stove?

A. There is, and that chamber extends from the top of the pot to the top of the stove; and connected immediately right in under this chamber surrounding the fire-pot is what may be termed a descending passage to the base, making a continuous chamber from the bottom to the top of the stove; the bottom of this chamber acting as a descending passage or flue, whilst the upper part of the chamber is connected with the exit-pipe by a cross-pipe with a damper, whereby we may have, at pleasure, a direct draught.

Q. 54. Is there a free circulation of the flame and gases in that part of the chamber formed by the sheet-iron casing and the upper portion of the feeder in Exhibit No. 4?

A. Yes, sir.

Q. 55. What are the direction and ultimation of the currents constituting such free circulation, and what produces such circulation?

A. When the draught-damper in the cross-pipe is open the tendency would be that a greater portion of the products of combustion and gases would ascend to the cross-pipe and encircle the upper portion of the feeder, whilst when closed the greater portion of the products of combustion would descend to the base; there being some little space around the edge of the damper, in the working of it a small portion of the products of combustion and the gases would be drawn up through these spaces.

Q. 56. What is the object of putting a damper in this cross-pipe?

A. To control the direction of the products of combustion either up or down by opening or closing the damper.

Q. 57. Is it desirable to be able to control, entirely, the direction of the products of combustion in the construction of a stove?

A. Yes, sir.

Q. 58. Do you seek such advantage in the construction of stove, Exhibit No. 4?

A. Yes, sir.

Q. 59. Did you design to make Exhibit No. 4 both a direct and
114 revertible flue stove?

A. Yes, sir; as is common in the general run of revertible-flue stoves.

Q. 60. When stove, Exhibit No. 4, is used as a revertible-flue stove only, is there a free circulation and expansion of the flame and gases or

products of combustion in that part of the chamber described in cross-question 54?

A. There is, to a small degree. What little space there is around the edge of the damper will have a tendency to create a circulation and relieve that part of the stove from a pressure that might be there.

Q. 61. Does not the little circulation in such instance depend mainly upon the imperfect construction or fitting of the damper in the cross-pipe?

A. No, sir; the damper is made smaller expressly for the purpose of getting a little circulation up to and from the upper portion of the stove into the exit-pipe, and that any overpressure of the heat or gases may find relief.

Q. 62. What would be the danger arising from this pressure, and what per square inch is supposed to be the amount of it?

A. The danger would be that unless the upper portion of the stove was perfectly tight fitted, there would be a leakage of gas in the room. The pressure per square inch I cannot give.

Q. 63. Then a mere revertible-flue stove, in your opinion, is impracticable?

A. No, sir; revertible stoves have been made without the cross-pipe that have been quite successful on the market. I think the cross-pipe is an improvement—betters the operation of the stove.

Q. 64. What direction do the products of combustion in the operation of stove, Exhibit No. 4, used as a revertible-flue stove, mainly take? Please give the particular course from the fire-pot to the exit-pipe.

A. By observation, as far as the flame can be seen, they, after revolving, take a descending course all around the pot to the base of the stove, and through the openings to the exit-pipe, and after that, through the exit-pipe to the main draught-flue or chimney, the same as in all revertible-flue stoves.

115 Q. 65. In what part of the combustion-chamber is the expansion of the flame and gases most free, according to your observations?

A. The centre. I have seen the blaze extend half way up the sheet-iron, and down as far as the base, both at the same time, while the direct flue was closed. The most blaze was nearest at the centre near the mass of the coal, the same as in common stoves.

Q. 66. What are the peculiar advantages of the construction of feeder like Exhibit No. 5 over that of feeder in Exhibit No. 4?

A. Its advantages are that we have a lower portion or neck flaring out, whilst the upper or larger portion is elevated from the intense heat; the lower portion or neck, by its flaring out, makes an easy and free discharge of the coal, and by its flaring out there is no danger or liability of the coal, when it becomes expanded by the heat of the fire in the fire-pot, of wedging itself fast there. Our idea is that when heat enters it expands the coal and swells it up, and by the contracted mouth, forming the base of an arch, the coal when so expanded forms an arch and chokes itself completely up, so much so that a poker or bar of iron has to be used to relieve it.

Q. 67. Did you experience any difficulty of this character in the use of Exhibit No. 1, No. 2, No. 3, and No. 4, and, if so, when did you first ascertain such tendency to choke up the mouth of the feeder?

A. We have experienced some difficulty of this character in all of them with a contracted mouth feeder.

Q. 68. What amount of expansion, or enlargement of the mouth have you found sufficient to overcome this tendency?

Exhibits B and C; in those patents the flues are returned in two vertical pipes outside of the fire-pot and within the casing.

Q. 70. Look at cross-question No. 80, and state how you understood it at the time you answered it.

A. I understood it as meaning the combustion-chamber.

Q. 71. What are the advantages resulting from the use of means for giving a direct draught in a revertible-flue stove?

A. The advantages are in kindling a fire or getting up a more rapid combustion.

Q. 72. If the damper in the cross-pipe of Exhibit No. 4 was made so as to close air-tight, would that prevent the upper part of the stove from being heated?

A. No, sir.

Q. 73. What would be the difference between the heating capacity of the upper part of the stoves Exhibits Nos. 1, 2, 3, and 4, and the stove described and represented in the patents Exhibits B and C?

A. In Exhibits Nos. 1, 2, 3, and 4, the upper part of the stove is partially heated by radiation from the products of combustion and slightly by imperfect upward circulation due to the leakage of the damper in the cross-pipe, whilst in the patents Exhibits B and C the *the* upper part of the stove is heated by the circulation of air which passes through apertures in the lower part of the casing, heated by radiation from the fire-pot, expansion-chamber, and revertible flues, and ascends to the top between the feeder and outer casing for heating purposes.

JASPER VAN WORMER.

Subscribed and sworn to before me this 28th day of September, 1868.

[SEAL.] W'M H. BISHOP,
Notary Public and Examiner by consent.

JOHN JOSEPH COYLE, a witness produced on the part of the defendants, and being duly sworn, testifies as follows:

Q. 1. What is your name, age, residence, and occupation?

123 A. John Joseph Coyle; age, 26 years; Albany, N. Y.; tin and sheet-iron worker.

Q. 2. Are you in the employ of Van Wormer & McGarvey; and if so, how long have you been so employed, and in what capacity?

A. I am in their employ, and have been since February, 1860, as a tin and sheet-iron worker, with slight changes in the year 1864. I quit their employ in the year 1864, and returned in July in the same year.

Q. 3. State whether you know of Van Wormer & McGarvey having constructed reservoir or self-feeding stoves during that period; and if so, state when, and describe the stove.

A. I do; in the winter of 1861; it is "Exhibit No. 2."

Q. 4. Was this stove used; and if so, for how long, and how did it operate?

A. It was used in the winter of 1861 and 1862, 1862 and 1863, 1863 and 1864, and worked well.

Q. 5. Describe the reservoir that was used in this stove when first put in operation, and the changes that were made in it, if any, subsequently.

A. A sheet-iron tube, starting from the top of the stove and going on an incline to the back, having a movable sectional piece dropping through. The movable piece was afterwards taken out and a fire-brick

section inserted. The fire-brick section broke, and was replaced by cylinder-brick. There was a hopper on top inserted in the top of the stove and went down into the feeder.

Q. 6. Where was this stove used?

A. In the workshop of Van Wormer & McGarvey, where I was working.

Q. 7. What other reservoir or feeding stove do you know of Van Wormer & McGarvey constructing after Exhibit No. 2?

A. The stove Exhibit No. 3.

Q. 8. When was this constructed?

A. In the winter of 1864 and 1865.

Q. 9. State where and for how long it was used.

A. It was used in the workshop where I worked that winter of 1864 and 1865, and part of the winter of 1865 and 1866.

124 Q. 10. How did it operate?

A. It worked well.

Q. 11. What other reservoir or self-feeding stove do you know of Van Wormer & McGarvey constructing, if any?

A. The stove Exhibit No. 4. It was constructed and put up in 1866, between Christmas and New Year's day.

Q. 12. State what, if any, change was made in the reservoir of this stove, and when made.

A. The reservoir was changed as shown by Exhibit No. 5. This change was made in the latter part of 1867. It was first made of sheet-iron, and made of cast iron this year.

Q. 13. Did you, at any time previous to your entering the employ of Van Wormer & McGarvey, see a stove with a reservoir or feeder in it, in their shop or building; and if so, when was it? and describe the stove, and state whether any such is here.

A. I did; it was the last week in January, 1860, and it is here marked Exhibit No. 1.

JOHN JOSEPH COYLE.

Subscribed and sworn to before me this 12th day of September, 1868.

[SEAL.] WM H. BISHOP,

Notary Public and Examiner by consent.

MICHAEL MCGARVEY, one of the defendants, being duly sworn, testifies as follows:

(The same exception is made by the counsel for the complainants to the examination of this witness as in the case of the witness J. C. Barnes.)

Q. 1. What is your name, age, residence, and occupation?

A. Michael McGarvey; age, 43 years; Albany, N. Y.; manufacturer and dealer in stoves, one of the defendants in this suit.

Q. 2. Will you state what self-feeding stoves were made in your establishment, giving the order in which they were made, and re-

125 ferring in your answer to any of the stoves here present in illustration of your statement?

A. In the fall of 1857 we put a feeder in stove Exhibit No. 1. In the winter of 1857 and 1858 the present feeder was put in. In the winter of 1858 and 1859 we altered the mouth of the feeder by putting on rings or nozzles, to lengthen it down and flare it out. In the fall of 1861 we made the oval stove, Exhibit No. 2, and put a feeder in that. It had an adjustable sheet-iron mouth-piece, and then we put on a brick mouth-

piece. We experimented with that, and it gave out, and we replaced it with cylinder-brick. We used that stove in the winter of 1862 and 1863, and in the winter of 1864 and 1865 we made Exhibit No. 3. That was first used with a soapstone fire-pot. Then it was used with a cast-iron fire-pot. We were also studying at that time the best mechanical plan of raising and lowering the feeder. That stove, Exhibit No. 3, was used up to the fall of 1866. In the winter of 1866 and 1867, between Christmas and New Year's day, we put up the stove Exhibit No. 4. In the fall of 1867 I had made Exhibit No. 5, of sheet-iron, by way of experiment, and made it of cast iron in 1868. I was experimenting in respect to durability and the like in 1867 and 1868.

Q. 3. What was the form of the first feeder used in Exhibit No. 1?

A. It was nearly a straight round cylinder.

Q. 4. What was the form of the second feeder in Exhibit No. 1?

A. It was conical. We then cut off the lower portion of the feeder, and put on a ring to enlarge the mouth thereof and flare it out.

Q. 5. How did that stove, Exhibit No. 1, operate?

A. Very well.

Q. 6. What was the name of the stove to which you added the feeder in the winter of 1857 and 1858?

A. The "American Gas Burner."

Q. 7. How long, prior to that time, had you been manufacturing the American Gas Burner stove?

A. I think since 1854.

Q. 8. In 1857 and 1858 did you make any other alteration in that stove except as to the feeder?

A. No, sir.

126 Q. 9. How did Exhibit No. 2 operate?

A. Very well.

Q. 10. How did Exhibits Nos. 3 and 4 operate?

A. Very well indeed.

Q. 11. From your practical experience, which have you found to work the best, the stove Exhibit No. 4, with the feeder belonging to it, or with the feeder Exhibit No. 5?

A. The feeder Exhibit No. 5.

MICHAEL McGARVEY.

Subscribed and sworn to before me this 12th day of September, 1868.
[SEAL.] W'M H. BISHOP,
Notary Public and Examiner by consent.

The further examination of witnesses is adjourned to September 23d, 1868, at eleven o'clock a. m.

SEPTEMBER 23D, 1868, *eleven o'clock a. m.*

Parties met pursuant to adjournment, and proceeded with the examination of witnesses for the defendant, as follows:

MERRIMAN P. DORSCH, a witness called for the defendants, being duly sworn, testifies as follows:

Q. 1. What is your name, age, residence, and occupation?

A. Merriman P. Dorsch; 45 years of age; New York City; chandelier business at present; formerly in the stove business.

(Counsel for the defendants puts in evidence a model marked "Defendants' Exhibit No. 6.")

Q. 2. State whether you know of stoves like model Exhibit No. 6

having been manufactured and sold; and if so, when, where, and by whom?

A. I know of such stoves having been manufactured and sold, I think, in 1847, but I am not positive, at 215 Beekman st., New York City, by Thompson & Munsell. The stove was called the Macgregor stove.

Q. 3. How near can you fix the date of the manufacture?

A. Within one year of that date.

127 Q. 4. Were any quantity of these manufactured and sold?

A. Quite a good many.

Q. 5. Were they put in use, and if so, how did they operate?

A. They were put in use, and operated very well.

Q. 6. Were you ever in the employ of Thompson & Munsell, and if so, when and how long?

A. I was; I think I commenced there in 1847; I was there a little over three years, I think.

Q. 7. State what, if anything, you had personally to do with the manufacture of these stoves?

A. I made all these stoves, as a worker in sheet-iron.

Q. 8. Were they in all respects made like the model Exhibit No. 6?

A. They were as far as principle is concerned. The internal arrangement was the same; the end of the flue at the bottom was made square instead of flat, as in the model Exhibit No. 6, and the little ventilator-door opened horizontally instead of raising up, as in the Exhibit No. 6.

And on his cross-examination by the counsel for the complainants, as follows:

Q. 1. Is this stove, Exhibit No. 6, now in the market?

A. I do not think they are.

Q. 2. How long since you have known them to be on sale in the stove market?

A. If my memory serves me right, they were only one season, which I think was in 1847.

M. P. DORSCH.

Subscribed and sworn to before me this 23 day of September, 1868.

[SEAL.] W'M H. BISHOP,

Notary Public and Examiner by consent.

CHARLES J. SHEPARD, a witness produced on the part of the defendants, being duly sworn, testifies as follows:

128 Q. 1. What is your name, age, residence, and occupation?

A. Charles J. Shepard; 53 years of age; Brooklyn, N. Y.; stove manufacturer and dealer.

(Counsel for the defendants puts in evidence a fire-place stove, marked "Defendants' Exhibit No. 7.")

Q. 2. State, if you know, when, where, and by whom the stove Exhibit No. 7 was made.

A. The stove was made by H. Nott & Company, I think at the Novelty Works, New York City, or at Albany, New York. They must have been made prior to 1835. They were called the "Saracenic grate," by the inventor, Dr. Eliphalet Nott.

Q. 3. Were many of them made and put in operation?

A. Yes; they were made and put in operation, and some are in operation this day, and they operate successfully.

(Counsel for the defendants now puts in evidence the stove marked "Defendants' Exhibit No. 8.")

Q. 4. State, if you know, when, where, and by whom the stove "Exhibit No. 8" was made.

A. It was made by Jordan L. Mott; it must have been somewhere about the year 1837 and 1838, in Water street, New York City.

Q. 5. Were many stoves of this kind manufactured and put in operation?

A. There were some, but what number I have no means of knowing. They were among the marketable stoves of that day. I saw one in use at the office of Jordan L. Mott, and it worked well. I have not seen any others in use.

Q. 6. The stove Exhibit No. 8 has a wooden feeder in it; does this correctly represent the feeder that was used in the stoves and which were made of brick?

A. I think it is a fair representation of it.

Q. 7. Did these stoves constructed by Mott have mica doors, as shown on the stove Exhibit No. 8?

A. They did.

Q. 8. Were the stoves, Exhibits Nos. 7 and 8, put in the market and sold?

A. They were. The Mott stove was put in the market in 1838
129 and 1839. I do not know how long it continued in the market. The Nott stove has always been in the market.

And on his cross-examination by the counsel for the complainants, he testifies as follows:

Q. 1. How long since you have seen the Mott stove in the market as a marketable stove?

A. I do not think it was in the market over two or three years.

CHARLES J. SHEPARD.

Subscribed and sworn to before me this 23d day of September, 1868.
[SEAL.] W'M H. BISHOP,
Notary Public and Examiner by consent.

WATSON SANFORD, a witness produced on the part of the defendants, being duly sworn, testifies as follows:

Q. 1. What is your name, age, residence, and occupation?

A. Watson Sanford; 49 years of age; Brooklyn, N. Y.; stove manufacturer and dealer; have been a manufacturer for about twenty years.

(By consent of parties, the counsel for the defendants puts in evidence the model stove marked "Defendants' Exhibit No. 9."

Q. 2. State whether you know of stoves like the model, Exhibit No. 9, having been manufactured and used, and if so, where, when, and by whom?

A. I made stoves similar to Exhibit No. 9, with the exception that the windows were lower down and spread more, and the feeder was conical or tapered towards the bottom of it, and the fire-pot more shallow than in the model. This stove was made by me in 1850, at 231 Water st., New York City. I made a few with, and a few without, mica lights. The bed-plate was made different in some of the stoves; some were made with a register-damper in the bed-plate. They
130 were principally used by the Hudson River Railroad on their cars; one other man opposite me, a printer, used one, and there were several others, but I do not recollect their names. The mica windows were hinged at the bottom so as to drop down.

Q. 3. With the exceptions you have mentioned, were the stoves you have mentioned constructed like the model, Exhibit No. 9?

A. Yes.

Q. 4. How did these stoves operate, successfully or not?

A. So far as I know, they operated well. I know nothing to the contrary. They were made as a specialty for the Hudson River Railroad Company. They wanted a stove to hold coal enough through the trip.

And on his cross-examination by the counsel for the complainants, he testifies as follows:

Q. 1. How long since you ceased manufacturing such stoves?

A. I have made none since 1851 for the railroad co. They discontinued their use because they stole their coal-hods.

W. SANFORD.

Subscribed and sworn to before me this 23d day of September, 1868.
[SEAL.] W'M H. BISHOP,
Notary Public and Examiner by consent.

SAMUEL PIERCE, a witness produced on the part of the defendants, and being duly sworn, testifies as follows:

Q. 1. What is your name, age, residence, and occupation?

A. Samuel Pierce; age, 65 years; Boston, Mass.; an improver of stoves, furnaces, and ranges.

131 Q. 2. State fully the extent of your experience in the construction of stoves, and the management of combustion.

A. I have spent most of my time from 1820 to the present in improving stoves, ranges, and furnaces, and have read everything that came under my observation relating to that subject in the English language, and have read the drawings of quite a number of French scientific works on the same subject.

Q. 3. What, if any, experience have you had in examining stoves and descriptions and representations of stoves with a view to determine their features of patentable novelty?

A. I have had, I think, a very large experience. I have been a member of the American Institute nearly ever since its formation. From 1833 to 1843 I spent a great deal of my time at the American Institute, where very many of the inventors would bring their new inventions to be examined. The corresponding secretary, Thaddeus B. Wakeman, would almost invariably hand them over to me.

Q. 4. Are you acquainted with the complainants' patents, Exhibits B and C, and do you understand what is therein described and represented?

A. They represent a base-burning heating-stove or furnace. This is the first time I have seen Exhibit C. I read the claims at the time they were published in the Scientific American, but disremember them now.

Q. 5. In what respect does the stove described in patent Exhibit C differ from the stove described in patent Exhibit B?

A. They both have a feeder, and they are both contracted at the lower part of the feeder. There is a difference in the form of contraction. One extends to a level with the top of the fire-pot, the other a little below the top. They both have flaring fire-pots, flaring upward and outward, one more than the other. They both send the products of combustion to the base of the stove, and then back to the exit-pipe. They both have direct draughts; one near the top of the fire-pot, directly over it, to the exit-pipe, the other near the top of the stove to the exit-pipe. They both have an exterior covering at the base and above to the top of the stove. The covering that surrounds the fire-pot and

132 flue or lower part of the stove for the admission of air is perforated, that the air passing through may come in contact with the flues and fire-pot, and be heated and ascend to the upper part of the stove, between the feeder and outer casing, into the room through the top of the stove. So I should judge from the drawings.

Q. 6. What would be the effect of the difference in the mode of effecting the direct draught in the two patents, Exhibits B and C?

A. The one that has its direct draught close to the top of the fire-pot, the one Exhibit C, would be more liable to be injured by the intense heat and become deranged than the one with the direct draught in the top. Another difference between Exhibits B and C is that the feeder in Exhibit C would be more liable to become clogged than the feeder in Exhibit B. If I was making I would prefer the feeder in Exhibit B to the feeder in Exhibit C.

Q. 7. Why would you prefer the feeder in Exhibit B to the feeder in Exhibit C?

A. I think it would be less liable to choke from lodging of the coal, because in Exhibit C the feeder is more contracted at its discharge than in Exhibit B.

Q. 8. When using the direct draught in the stoves described in Exhibit B and C, through what does the draught pass on its way from the fire-pot to the exit-pipe?

A. In Exhibit C it passes directly from the fire-pot to the exit-pipe, through the cross-pipe, to the exit-flue. In Exhibit B it goes through the feeder and into the cross-pipe at the top to the exit-pipe.

Q. 9. What would be the effect on the charge of coal in the feeder by carrying the draft directly through it to the exit-pipe?

A. It would heat it very hot.

Q. 10. Would that be an advantage or a disadvantage?

A. I cannot conceive that it would be any advantage. The only disadvantage that I can see is that it would expand the coal, and you would not get the benefit of the heat at the base as you would when the products of combustion passed through the base. Of course the feeder would be made hotter by passing the products of combustion through it.

133 Q. 11. What is the effect produced on coal by heating it before it reaches the point of ignition?

A. The effect is to expand it slightly, and some coals to slack, and make it fall to pieces.

Q. 12. Will anthracite coal evolve gas if heated in the feeder?

A. Some anthracite coal will evolve gas at a much lower temperature than others. Those that evolve it at the lowest temperature would be likely to evolve gas to a greater or less extent. Those that require a higher temperature would evolve gases if they were heated to a temperature sufficiently hot.

Q. 13. In view of the manner in which the air heated in the stove Exhibit B, by circulating around the fire-pot and flues, passing up around the feeder, and between it and the outer casing, would the coal in the feeder be heated sufficiently to evolve gas?

A. I think it might do it with coals that evolve gases at the lowest temperature. In all base-burning feeding-stoves the coal within the feeder does evolve more or less gas, and I think it is caused more by the radiated heat of the fire in the fire-pot than by the heat received outside of the feeder.

Q. 14. Are these gases combustible?

A. They are.

Q. 15. Which would be the most wasteful of combustible matter—the arrangement for the direct draught in Exhibit B or that in Exhibit C?

A. In Exhibit B, decidedly so, while the direct draught was on.

Q. 16. Have you examined the Nott stove, defendants' Exhibit No. 7? If yea, state your knowledge of the various forms in which the Nott stove has been constructed prior to 1857.

A. I have. I have been familiar with the Nott stove from 1832 to the present time. Somewhere between 1832 and 1835 I was in the employ of H. Nott & Co., 242 Water street, New York City, to superintend the putting up of the Nott stoves in the city of New York, and that made me very familiar with them in all their forms.

Q. 17. State the general character of the Nott stove?

A. The Nott stove is a base-burning stove. They were gen-
134 erally constructed of a square or oblong base, rising perpendicularly from two and a half feet in height to six feet or thereabouts. The outlet from the combustion-chamber was in the rear of the stove. It always first ascended, and in the direct draught through a vertical flue, thence through the smoke-pipe into the chimney. When they wished to make a revertible-flue stove out of a direct draught, there was a hollow cap placed on the top of the vertical flue to receive the products of combustion, from which cap two flues, descending to the base of the stove, were connected together at the base by a cross-pipe. When this stove was in operation the products of combustion, after leaving the combustion-chamber, ascended the vertical flue into the cap directly to the chimney, when the damper was open. When the damper was changed in position, the direction of the products of combustion was changed also. They passed to one side of this cap, down the flue on one side of the stove to the base, through the cross-pipe, up a flue on the opposite side, again into the other end of the cap, through the exit-flue, into the chimney. All of the Nott stoves have a grate at the bottom of the fire-chamber much larger than the size of the feeder. They have all a mica light in the front of the lower section of the stove. The upper part, or the principal part of the feeder, is exposed to the direct action of the atmosphere in the room as well as the body of the stove. They made another class of stoves, called the Saracenic Parlor Grate, for dining-rooms, the principle of which is the same as those above described, with the exception that the products of combustion did not rise after leaving the combustion-chamber, as high as the top of the stove, but passed horizontally, then turned directly down in a flue behind the stove to the base of the stove, into a chamber across the back of the stove, and then ascended through two vertical flues to near the top, where they united again. All those stoves I have described as made by Nott & Company had a flue leading from the feeder near the top to the exit-pipe. They all had an ash-draw fitted to them to receive the residuum. In all those stoves I have been describing I have refer
ence to those gotten up before the year 1840.

The further examination of this witness is adjourned to September 29th, 1868, at half past ten o'clock a. m.

135 SEPTEMBER 29TH, 1868—*half-past* 10 *o'clock a. m.*

Parties met pursuant to the above adjournment, and continued the examination of the witness, Samuel Pierce, as follows:

Q. 18. Look at the plate marked "Defendants' Exhibit No. 14*b*," and mark thereon the word "Nott" on each of the figures which represent the Nott stove with which you were acquainted prior to 1857?

A. I have examined said sheet, and so marked thereon.

Q. 19. If you find in Exhibit No. 14*b* representations of the stoves described in your answer to the 17th question, mark the first one described No. 17*a*, and the other No. 17*b*?

A. I find them represented, and have marked them accordingly—one No. 17*a* and one No. 17*b*.

Q. 20. Look at the stove marked "Defendants' Exhibit No. 7," and state whether it is like the Nott stove secondly described in your answer to the 17th question.

A. It is.

Q. 21. Are you acquainted with the Jordon L. Mott stove, marked Defendants' Exhibit No. 8; and if yea, describe its general features.

A. I am acquainted with it. It is a square stove at its base, and enlarges at each end above its lateral outlets. It has a square feeder filled from the top, lined with fire-brick, contracted at its lower end, with a flue at each end from the combustion-chamber. These flues are large, to admit an air-flue in the centre of each flue. The centre flues are open at both ends for the purpose of receiving air at the lower ends and delivering it at the upper ends heated. The large flues which receive the products of combustion terminate in a cap at the top, into which the products of combustion pass, and thence to the exit-pipe in the chimney. It has a grate, to hold the coal, larger than the mouth of the feeder. It has a mica frame in front for illumination, and a vertical grate in the rear of the same, to prevent the coal from coming in contact with the mica.

Q. 22. Is the fire-pot above the grate perforated or imperforated?

136 A. The front part of the fire-pot has perforations through a vertical grate. The rest of the fire-pot is imperforated.

Q. 23. Will you measure Exhibit No. 8, and state how high the front grate extends upwards from the upper surface of the bottom part of the grate to the lower edge of the front plate forming the front of the fire-pot, and give the height of the said front plate of the fire-pot, to its upper edge, where the illuminating grating begins?

A. I have so measured, and find I was mistaken as to the existence of a front vertical grate in the rear of the mica. The height from the upper surface of the bottom grate to the under side of the mica opening is about five and a half inches. The front part of the bottom grate turns upwards in front about an inch and three-quarters. I have measured the solid plate in front from the top of the turned-up part of the grate.

Q. 24. Immediately above the upper edge of the fire-pot, and between that and the lower end of the flues for the products of combustion, what is the form and capacity of the space for the products of combustion to pass from the fire-pot to the flues?

A. There is a space above the top of the fire-pot, oblong in its shape, which receives the products of combustion, through which the air-pipe passes. Its capacity is greater than the fire-pot, and leads to the flues.

(It is consented by the parties that the examiner shall prepare and put in evidence drawings, illustrating the construction and operation of the stove Exhibit No. 8, said drawing to be marked Defendants' Exhibit No. 18*b*.)

Q. 25. Look at model marked Defendants' Exhibit No. 6, and state whether you are acquainted with the McGregor stove represented by said exhibit, and describe its structure and mode of operation.

A. I have seen the McGregor stove of the shape represented by this

model, with a fire-pot near one end, with a feeder filled from the top, with its outlet for the products of combustion at the bottom, an
137 ash-draw under its bottom, to receive the ashes falling from the grate. The operation of this stove is that the products of combustion pass from the top of the fire-pot vertically to the top of the stove, filling the entire chamber, exit, or go-out at the bottom into the smoke-flue, thence into the exit-pipe to the chimney, heating the entire stove very evenly, including the feeder.

Q. 26. Is it a direct or revertible draught stove?

A. Revertible.

Q. 27. What constitutes, in that stove, the space in which the revertible draught takes place?

A. I should consider it what is called the combustion-chamber.

Q. 28. What forms the outer and inner boundaries of that combustion-chamber?

A. It is bounded on the outside by the outer casing and top and bottom, and on the inner side by the fire-pot and feeder.

Q. 29. What, if anything, is there for the passage of the products of combustion from the hole in the bottom of the stove to the exit-pipe?

A. A flat, square flue, leading across the bottom and projecting one side beyond the bottom of the stove, where it communicates with the exit-pipe.

Q. 30. What is the form of the feeder, and the position of its lower end relatively to the upper end of the fire-pot?

A. It is conical, smallest at its lower end. It terminates near the upper surface of the fire-pot, leaving a large space between the outer periphery of the feeder and the inner periphery of the fire-pot.

Q. 31. Look at the model, marked Defendants' Exhibit No. 9, and assume that the fire-pot was not so deep as in the model, and that the feeder was conical or tapered towards the bottom of it, and the windows were lower down and spread more, and state what are the features of the stove thus represented.

A. It would constitute a base-burning stove, with a conical feeder, smallest at its lower end, a combustion-chamber around the feeder and above the solid fuel, with two descending flues opening into the top of the combustion-chamber, descending as low as the bed-plate of the fire-box, and communicating with an ascending flue in the rear of
138 the stove to the exit-pipe. It would have its illumination near the bottom of the feeder by mica windows. There is a cross-flue leading from the upper part of the feeder into the exit-pipe controlled by a damper attached to the cover of the feeder, which is opened or closed by turning the cover around.

Q. 32. Are you acquainted with the stove described and represented in the Defendants' Exhibit No. 6*b*; and, if yea, state what is the form of the fire-pot therein represented in connection with the feeder.

A. I am somewhat acquainted with them, having seen them described in an English scientific monthly. The fire-pots are flaring, largest at their upper end. The feeder in the cook-stove is the largest at its lower end; also in the heating-stove.

Q. 33. Are you acquainted with the stove described and represented in Defendants' Exhibit No. 7*b*; and, if yea, state what is the form of the upper end of the fire-pot and of the flame-chamber around the lower end of the feeder leading to the flues?

A. I am somewhat acquainted with the exhibit, having seen it described in an English monthly scientific work published in London. The fire-pot is very much flaring at its upper end, leaving a large

chamber for the expansion of the products of combustion around the lower end of the feeder.

Q. 34. State whether that is a direct or revertible-flue stove, and the direction of the draught.

A. In my opinion it is a revertible-flue stove. The direction of the draught is at first vertically up to the top of the stove through pipes into a chamber surrounding the top of the feeder; thence down through pipes to the base of the stove; thence through the floor; and thence to the chimney below. Sometimes the exit is near the base in the same room.

Q. 35. Have you examined the stove described and represented in the Henderson patent, Defendants' Exhibit No. 11*b*; and, if yea, state what is the form of the feeder, and which is the largest—the feeder or the fire-pot, and whether it is a direct or revertible-draught stove?

A. I have examined it as far as the drawings are concerned. I have not read the description, but I have seen the stove in operation.

139 The feeder is conical, smallest at its lowest end, with a fire-pot very much larger than the feeder. I should call it a revertible-flue stove.

Q. 36. Are you acquainted with stove described and represented in the Sexton patent, defendants' Exhibit No. 9*b*?

A. I am.

Q. 37. From your practical experience in base-burning stoves, what is the best form of feeder and fire-pot, having in view the proper management of combustion and economy of fuel?

A. I should make the walls of the fire-pot vertical and lined with fire-brick; the feeder the same, or the lower end slightly enlarged. I do not mean to line the feeder, but have the walls straight. I should make the lower end of the feeder of fire-brick. I would make the fire-pot straight, for the reason that the coal burns better in a straight fire-pot than it does when flaring with the large end uppermost. A lined flaring fire-pot with fire-brick will destroy itself much sooner than a straight one, the cause of which is that clinkers more readily adhere to it. I should line the fire-pot with fire-brick, for the reason that the combustion of anthracite coal is more perfect in fire-brick than in an iron fire-pot. I should make the feeder straight, or slightly enlarged at its lower end, for the purpose of preventing the choking of the coal. I should make the lower end of it of fire-brick, to secure the durability of the lower end of the feeder, to prevent it burning out. If I wanted to increase the combustion in that same stove, I should enlarge the lower end of the fire-box, making it smallest at the top. The reason for enlarging the lower end of the fire-pot lined with brick, is to prevent the clinkers adhering to the walls, and, by increasing the size of the grate, you admit more air through the grate into the solid fuel, and the combustion is more perfect. Another reason for lining the fire-pot with fire-brick, is that brick being a poor conductor of heat, the coal is kept hotter than it would be in an iron fire-pot, consequently the combustion will be better, as an iron fire-pot gives off heat rapidly, which is taken up by the air outside, cooling the fire-pot, and consequently cooling the coal in the fire-pot.

140 Q. 38. With a fire-pot made of iron, which is best, to have the downward draught in a flue space entirely surrounding the fire-pot, and formed by the outer surface of the fire-pot and the outer casing of the stove, or to have the downward draught in two flue pipes between the fire-pot and a perforated outer casing for the admission of air, as in complainants' patents, Exhibits B and C?

A. The one first described in the question would have the best combustion, other things being equal.

Q. 39. If required in such a stove to make the fire-pot of iron not lined with fire-brick, and to enlarge the space between the fire-pot and the feeder, which, in your opinion, would be best, to enlarge the whole diameter from top to bottom with the sides parallel, or enlarging the upper end of the fire-pot by making it flaring outwards and upwards?

A. I should enlarge the whole fire-pot from bottom to top.

Q. 40. Look at the stoves defendants' Exhibits Nos. 1, 2, 3, and 4, and state whether they are substantially like or substantially different?

A. I should consider them substantially alike, although there is a difference between Nos. 1 and 2, and Nos. 3 and 4. Nos. 1 and 2 have straight fire-pots, and Nos. 3 and 4 have flaring fire-pots, largest at the top. In Nos. 1 and 2, the outer casing is straight from the base to the top. In Nos. 3 and 4, the outer casing swells out between the base and the top. They are substantially alike in this: all four of them have feeders, with holes for the supply of coal; they all have fire-pots; they all have revertible flues which descend to the base and to the exit pipe; they all have combustion-chambers, and they all have the mica for illumination, and ash-pits for receiving the ashes from the grates. They all have a cross pipe and damper for the direct draught near the top of the stove; and all admit air through the ash-pit for combustion.

Q. 41. Is there any difference between them in the kind of flue space for the downward draught other than what is due to the external shape of the stove?

A. None.

Q. 42. State whether any of the said four stoves would fail to work successfully if put in use?

141 A. They would not.

Q. 43. Which in your opinion would work most successfully for the purpose of heating, Exhibit No. 1, or Exhibit No. 4, having in view also the economy of fuel?

A. Exhibit No. 1.

Q. 44. State what, if any, difference you find between the stove described in complainants' patent, Exhibit B, and defendants' stoves marked Exhibits Nos. 1, 2, 3, and 4.

A. The difference between the complainants' stove and the defendants' stoves is that in the complainants' stove the products of combustion are taken from near the top of the fire-pot, at opposite sides of the same, into flues passing down outside the fire-pot to the base, and thence to the exit pipe; also a cross flue for direct draught with a damper to the same, leading to the exit pipe. The upper part of the feeder in complainants' stove is not exposed to the heat when the direct draught is opened, as it is in the defendants'. The downward flues in complainants' stove and the defendants' differ in this; in the complainants' they go down in two separate flues at the side of the fire-box to the base, under the ash-drawer, then back to the exit pipe. In the defendants' stoves the products of combustion descend to the base, surrounding the fire-pot between the fire-pot and outer casing of the stove, and thence to the exit pipe. In the complainants' stove the air from the room comes in contact with the fire-pot and flues to be heated, and in defendants' stoves it does not do so.

Q. 45. In the patent, Exhibit B, when the direct draught is in action, state whether the products of combustion pass through the charge of coal in the feeder?

A. They do.

Q. 46. What did you mean then in your answer to the 44th question, where you say "the upper part of the feeder in complainants' stove is not exposed to the heat when the direct draught is opened, as it is in the defendants'?"

A. One heats the feeder from the outside by the products of combustion passing around it, and the other inside by the products of combustion passing through the charge of coal in the feeder.

142 Q. 47. Look at the stove marked Excelsior No. 11, John F. Rathbone, Albany, and state whether it is constructed in accordance with the plaintiffs' patent Exhibit B, except as to the direct draught?

A. I have examined said stove and find it is made according to Exhibit B, with the exception that the direct draught is taken from near the top of the fire-pot instead of near the top of the feeder, and also the revertible-flue draught does not pass under the ash-pit but around the same to the exit pipe.

Q. 48. In your opinion is the mode of constructing what is termed in the complainants' patent, Exhibit B, the expansion chamber and revertible or downward flues, as represented in Exhibit Excelsior No. 11, practically good or objectionable, and give your reasons?

A. I should object to construct a base-burning stove in that way; because a stove constructed in that manner with a cast-iron fire-pot with the flues attached to the same, as in that stove, in use must get out of order, for the reason that the fire-pot will expand, increase its length as well as diameter, by which means the arms of the expansion-chamber will be raised from the flues either at the top or the bottom, making an opening into the same, which will be very injurious to the operation of the stove.

Q. 49. How long have you been acquainted with mica illuminating gratings as applied to stoves?

A. Since 1820.

Q. 50. In what part of stoves are they usually placed when used?

A. In some stoves in front of the solid fuel or coal, and in others above the solid fuel, to illuminate from the radiation of the coal and blaze.

Q. 51. So far as regards illumination, or throwing out the rays of light from the burning coal and flame through a grating covered with mica, does it make any difference whether the coal be supplied to the fire-pot by a feeder or by a servant with a coal-hod?

A. Not a particle.

Q. 52. How long have you been acquainted with revertible-flue stoves having a cross pipe and damper leading to the exit pipe for direct draught?

A. Since 1832.

143 Q. 53. So far as regards the combined relations of revertible flues and means for direct draught with a fire-pot, is it of any importance whether the coal be supplied to the fire-pot by a feeder or by a coal-hod?

A. Not the least.

Q. 54. Examine stove marked Defendants' Exhibit No. 1, and state whether you find anything in the size and relative proportions and relations of the feeder and fire-pot to prevent that stove from being a practical successful stove?

A. Nothing, except the burning off the bottom of the feeder.

Q. 55. Would that feeder be more likely to be burnt than any other feeder, if made of the same material?

A. No more, the circumstances being the same that surround it.

Q. 56. Would the coal in the annular space between the lower end of the feeder and the circumference of the pot rise above the lower end of the feeder?

A. It would not rise quite up to it.

The further examination of this witness is adjourned to September 30th, 1868, at half-past ten o'clock a. m.

SEPTEMBER 30*th*, 1868, *half-past ten o'clock a. m.*

Parties met pursuant to adjournment, and continued the examination of the witness, Samuel Pierce, as follows:

Q. 57. Examine Exhibit No. 4, and state whether, in your opinion, the mode of adjusting the height of the feeder relatively to the fire-pot is of advantage in the use of a reservoir stove.

A. If I was getting up a base-burning stove, I should not get it up in that way to put on the market. If it was desirable to have an adjustable feeder, the manner in which it is done in Exhibit No. 4 is very simple to accomplish that object. It is not in any way liable to get out of order.

144 Q. 58. For burning coal of different sizes is it or not desirable to have the mouth of the feeder at different heights above the grate?

A. It is.

Q. 59. Examine the feeder belonging to the stove Defendants' Exhibit No. 4, and the feeder marked Defendants' Exhibit No. 5, and state which, in your opinion, is the best adapted for the successful working of a feeder-stove.

A. The shape of the lower end of the feeder Exhibit No. 5 I should prefer to No. 4, No. 5 being slightly enlarged and No. 4 contracted at the delivery.

Q. 60. What, if any, objection have you to the upper part in connection with the lower part of Exhibit No. 5, and give your reasons?

A. In some sizes of coal it might clog at the contraction at the junction of the upper and lower part.

Q. 61. In the use of base-burning stoves with feeders having no contraction in any part of their length, have you ever known any difficulty in the burning of the coal by reason of the weight of the column of coal in the feeder on the column of coal in the fire-pot?

A. I never did.

Q. 62. Do you know of any instance in which a weight has been put on top of the charge of coal in such feeders; and if yea, for what purpose and by whom?

A. I do; in the Nott stove. There was always a follower made of cast iron, with a ring on its upper side, attached to the follower, for the purpose of handling it, which would weigh from ten to twenty-five pounds, according to the size of the stove, which would have to be removed before charging, and replaced after charging on the top of the pile of coal in the feeder. It would settle with the coal as the coal was consumed.

Q. 63. Are you acquainted with John F. Rathbone, stove-manufacturer in Albany; and if yea, how long have you known him?

A. I am acquainted with him, and have known him for the last twenty years or more.

Q. 64. Do you know of his manufacturing stoves like the stove marked Excelsior No. 11, as licensed under the patents Exhibits B and C?

A. I have seen the stove as cast with his name on it.

145 Q. 65. Do you know if the feeder-stoves manufactured by John F. Rathbone latterly have been changed in some respects from the stove marked "Excelsior No. 11" and marked by the examiner "Defendants' Exhibit No. 10?"

A. I do know they have been changed.

Q. 66. Look at the stove marked "Brilliant, 1868," "Defendants' Exhibit No. 11," and state whether it is one of the stoves so altered or like them.

A. It is.

Q. 67. State in what respects Exhibit No. 11 has been changed from Exhibit No. 10.

A. They have taken off the side flues, and in place of the perforated casing around the fire-pot they have placed an imperforated casing so as to form a flue all around the fire-pot, so that the products of combustion, after leaving the combustion-chamber, instead of passing down two flues outside of the fire-pot, pass down a flue surrounding the fire-pot, formed by the fire-pot and outer casting. There is no admission of air near the base to come in contact with the fire-pot and flue to be heated, and then rise to the upper part of the stove, passing into the room through the openings in the top or near the top in the front part of the outer casing. The fire-pot is different, again, being lined with fire-brick. There is an alteration in the mechanical construction of the feeder, and the products of combustion pass under the ash drawn before reaching the exit-pipe. It has mica lights extending around the principal part of the outer casing, with a door opening into the combustion-chamber or mouth of the feeder.

And on his cross-examination by Joel Tiffany, esq., counsel for the complainants, he testifies as follows:

Q. 1. What experience, practically, have you had in the operation of base-burning stoves having an enlarged or flaring fire-pot at or near the lower end of a feeder contracted at its mouth or place of discharge?

A. I have had no experience, practically; only I have seen them in operation for the last ten years at different places.

146 Q. 2. What effect upon the extent of the surface of the burning solid fuel has the expansion of the top of the fire-pot in conjunction with a contracted discharge or mouth of the feeder?

A. To increase such surface.

Q. 3. In base-burning stoves of such a class where is the burning surface of the solid fuel to be found?

A. To be found below the mouth of the feeder and between the outside of the feeder and the inside of the top of the fire-pot.

Q. 4. Why is the surface of the solid burning fuel found only at such place?

A. It is the only surface visible to the eye in the structure of that class of stoves when standing in front.

Q. 5. Do the gases generated from the coal in the fire-pot usually ignite at this surface, if at all?

A. If the stove is properly constructed, they will ignite before they reach that surface; if improperly constructed, according to my idea of a base-burning stove, there will be gases rise from the surface of the coal that will not ignite unless they receive a second supply of atmosphere.

Q. 6. Does the flame appearing upon the surface of the solid fuel in such stoves result from an ignition of the gases before reaching such surface, or from gases ignited at such surface?

A. From both.

Q. 7. When there is a free draught on the grate at the bottom of the fire-pot, and none at the surface of the solid fuel, can you obtain free ignition at such surface without resorting to forced circulation through the grate?

A. You would not get it either way, except partially by the forced draught.

Q. 8. To what, then, is free ignition of the gases at the surface of the fire-pot principally due?

A. It is due to the air passing up through the solid fuel and the air that enters above the solid fuel into the combustion-chamber. The nearer to the surface of the solid fuel the better.

Q. 9. What effect may the form and structure of the combustion-chamber have upon determining the relation of the air entering it to the surface of the solid fuel?

147 A. The form and structure of the combustion-chamber that would cause the supply of air above the solid fuel to reach the solid fuel the quickest, and mix the air with the gases arising from the solid fuel, would be the best to consume the gases, and hence form in this respect may become material.

Q. 10. When the gases are ignited by the presence of air at the proper temperature of the gases, what effect has such ignition upon quantity of space occupied by the air prior thereto?

A. I should think that after the air enters the gases and a second combustion takes place, the gases combined with the air become expanded or increased in bulk.

Q. 11. To obtain a free combustion by the admission of air to the surface of the solid fuel, as above, must there be provision for the passing away freely of the expanded air and gases after combustion has taken place?

A. There must be to make room for the further admission of air to support combustion.

Q. 12. What causes the formation of clinkers in a stove?

A. I have never settled that satisfactorily in my own mind. I find in experiments that the coal that makes the most clinker, (that is the red-ash coal,) when burnt at a very high temperature, when burnt at a low temperature makes none.

Q. 13. Do fire-pots lined with fire-brick tend to make more clinkers than those of iron only?

A. They do.

Q. 14. Does the presence of clinkers indicate that combustion was less perfect than in cases where no clinkers are found?

A. The combustion is no more perfect in the one case than in the other. The clinker is found independent of the completeness of combustion.

Q. 15. Why do you prefer the fire-pot to be lined with fire-brick or other non-conducting substance?

A. I think the combustion is better when so lined, because the fire-brick, being a poor conductor of heat, keeps the coal hotter than if burnt in an iron pot, other things being equal.

148 Q. 16. Which is the best for radiating or outward heating purposes?

A. Iron.

Q. 17. If an iron pot can be made durable and completely consume the coal, would it not be preferable?

A. It would not for me if I was constructing a stove; but if such a pot can be constructed I think the public would prefer it.

Q. 18. What are your objections to a fire-pot in the class of base-burning stoves under examination having a flaring top or mouth practically?

A. It is more difficult to clean them of ashes in agitating the grate, and they are more liable to clinker up the brick than they would be if the walls of the fire *fire*-pot were perpendicular.

Q. 19. Do the stoves known as the "Brilliant," as made under the complainants' patents, Exhibits B and C, possess this flaring top of the fire-pot, and do they produce clinkers when in use?

A. They do possess the flaring fire-pot to a certain extent. When properly managed I should think they would not have a tendency to make clinkers. By proper management I mean regulating the amount of air to the grate so as to obtain proper combustion and thereby the amount of heat necessary. I do not know the fact whether they produce clinkers or not when in general use.

Q. 20. Does the form, style, and illuminating capacity of a heating-stove add to its value in the market, its heating qualities and other things being equal?

A. I think it does, but not in my estimation. I object to mica lights in any heating-stove.

Q. 21. Examine stove, defendants' Exhibit No. 11, and describe the formation of the combustion-chamber immediately about the upper portion of the fire-pot and the lower portion of the feeder; that is, what its boundary is, and of what composed, and how constructed.

A. It is formed by the outer casing of that part of the stove extending upward and inward towards the feeder, and by the outer walls of the feeder on a line with the same extending all around the stove, the outer covering of which is composed or constructed of iron and mica lights for heating and illumination. The inside is composed of iron and brick.

149 Q. 22. What is the shape of such chamber so bounded as above about the top of the fire-pot and around the lower end of the feeder, and for what object or purpose is that shape employed, according to the terms of the complainants' patents?

A. It is cylindrical, widest at its base, at that part nearest to the fire-pot, and smaller at the top; internally formed by the shape of the mouth of the feeder, externally by its outer case, as above described; and, in the language of the complainants' patent, is called the horizontal expansion-chamber for the purpose of the expansion of the flame and gases at that point.

Q. 23. What relation, if any, does this chamber sustain to the flaring fire-pot and contracted discharge of feeder?

A. It derives its form in part from it.

Q. 24. What is the utility of a feeder in this class of stoves?

A. In the first place it is to receive and hold a supply of coal for the purpose of constituting a constant feeder to keep up a uniform supply of fuel tending to produce uniform combustion. In the second place that part of the coal above the fire-pot is receiving heat so that when it comes down into the fire-pot, where the air is passing up through the grate and other air is coming in above the fire-pot through crevices or openings, it is prepared for immediate combustion.

Q. 25. Examine defendants' Exhibit No. 4, and state if you find in it such enlarged top of fire-pot, contracted mouth of feeder, and horizontal flame-expansion chamber, as above described.

A. I do.

Q. 26. Is there a distinction to be made between a class of stoves which have within the stove itself provisions for a direct draught only, and that class of stoves which have within the body of the stove provision for a revertible draught by means of flues or pipes as a part of the stove?

A. There is a distinction; one is called a direct draught or flue stove, and the other is revertible draught or flue stove, both contained within themselves. No. 17 in defendants' Exhibit No. 14*b*, is an example of a revertible flue, and No. 18, in the same exhibit, is a direct-flue stove.

150 Q. 27. When the direction of the draught outside of the stove proper is determined by the direction of the exit or connecting pipe, does that direction alter the class to which such stove belongs?

A. It does not; but it may change the power of the stove to give out its heat.

Q. 28. Please state the operation of the Nott stove in respect to the place of combustion relative to the feeder and the grate.

A. The combustion is at the base of the column of coal, caused by the air passing up through the grate on which the coal rests, and through the vertical grate in the rear of the mica in front, and through the base of the column of coal on the grate to its lateral outlet in the rear of the stove.

Q. 29. Where, relatively, and of what size, was the combustion-chamber in such stoves compared with the draught flue or pipe?

A. The combustion-chamber and flue between the point of combustion and the top of the stove were one and the same; above the top of the stove the flue was contracted.

Q. 30. What experience have you had with the choking of the coal in the mouth of feeders in feeder-stoves?

A. My experience has been entirely with the Nott stoves, and such stoves as I have made for experiments.

The further cross-examination of the witness is adjourned to October 1st, 1868, at half past ten o'clock a. m.

OCTOBER 1*st*, 1868, *half past ten o'clock a. m.*

Parties met pursuant to adjournment, and continued the cross-examination of the witness, as follows:

Q. 31. How many openings or flues are there to be found in complainants' new Brilliant of 1868, defendants' Exhibit No. 11, leading from the combustion-chamber into the double base?

A. There is one flue leading from the combustion-chamber to the lower part of the fire-pot; it there passed into the double base

151 through an opening on each side of the fire-pot through a plate which is the covering to the flue under the ash-drawer, and thence to the exit-pipe.

Q. 32. Please state whether the Sexton stove, defendants' Exhibit No. 9*b*, has a fire-pot distinct from the stove itself.

A. The body of the stove forms a part of the fire-pot.

Re-direct examination:

Q. 68. Is there any provision in complainants' patents, Exhibits B and C, for the admission of air to the upper surface of the solid fuel in the fire-pot?

A. There is none made for that purpose.

Q. 69. Which is best adapted to the introduction of air to the gases above the solid fuel in the fire-pot, the stoves, Exhibits Nos. 1, 2, 3, and 4, or the stoves described in the complainants' patents, Exhibits B and C?

A. In any of the stoves where the outer casing form a part of the flame-chamber, it would be easy to make holes for the admission of air. In the complainant's Exhibit C and defendants' Exhibit No. 4, I should think there would be very little difference.

Q. 70. Do you find any provision in either of the complainants' patents, Exhibits B and C, for the introduction of air in the combustion or flame chamber above the solid fuel?

A. No.

Q. 71. If the fire-pot in the stove "Brilliant," defendants' Exhibit No. 11, would not produce clinkers when in use, to what would that be due?

A. To the construction of the fire-pot so that the coal that is undergoing combustion is shallow.

Q. 72. In your answer to the 21st cross-question, in speaking of the stove, Exhibit No. 11, marked the "Brilliant," you state that the combustion-chamber is formed by the outer casing and the outer walls of the feeder; does that mode of construction of forming the combustion or flame chamber correspond with complainants' patents, Exhibits B and C, or with defendants' stoves, Exhibits Nos. 1, 2, 3, and 4?

152 A. It does not conform with the complainants' patents, Exhibits B and C, but conforms with defendants'; Nos. 3 and 4, more particularly.

Q. 73. Do you find in either of the patents, Exhibits B and C, that any part of the combustion or flame chamber, termed in the patents the expansion-chamber, is formed by the outer casing of the stove?

A. I do not.

Q. 74. State more fully what you mean by clinkering in your testimony. Do you mean the adhering of clinkers to the inner surface of the fire-pot, or to the clinkering of coal from imperfect combustion, which clinkers, when found, will be discharged through the grate with the ashes?

A. I mean that they would adhere to a flaring fire-pot more readily than they would to one whose walls were perpendicular, or one largest at the bottom and smaller at the top.

Re-cross-examination:

Q. 33. Upon what condition does the adhering of clinkers to the side of a fire-pot depend?

A. It depends upon the temperature of the clinker. It must be in a fusible or melting state when it comes in contact with the walls or fire-brick which form the side of the fire-pot, which fire-brick must be at such a temperature as not to chill the clinker when it comes in contact.

Q. 34. Will clinkers adhere to the side of a fire-pot when ashes are found between the fusible clinker and the side of the pot?

A. I think not, unless the ashes fused with the clinker and fire-brick. I do not know whether the ashes would fuse or not.

Q. 35. Would ashes be more likely to remain in contact with the sides of a flaring fire-pot than to the sides of a perpendicular fire-pot?

A. They would.

Q. 36. What constitutes the outer walls of the expansion-chamber mentioned in complainants' patents B and C?

A. That part that rises above the fire-pot inside of the outer
153 casing and cast with the fire-pot. I mean the part which is above the solid fuel resting in the fire-pot to which the flues which receive the products of combustion are attached.

Q. 37. Do you find any provision in the construction of defendants' stove, Exhibit No. 4, specially designed for the admission of air to the solid fuel on top of the fire-pot?

A. I do not.

SAMUEL PIERCE.

Sworn and subscribed to before me this 1st day of October, 1868.
[SEAL.] W'M H. BISHOP,
Notary Public and Examiner by consent.

Defendants' counsel offers in evidence a certified copy of the original letters-patent granted to J. G. Treadwell and W'm Hailes for improvement in stoves, dated May 7th, 1861, and to be marked "Defendants' Exhibit No. 15*b*."

Also, a certified copy of the application for the patent, Exhibit No. 15*b*, with file-wrapper, and contents to be marked "Defendants' Exhibit No. 16*b*."

Also, a certified copy of the application, with file-wrapper and contents of the re-issued patent, complainants' "Exhibit B," to be marked "Defendants' Exhibit No. 17*b*."

ROBERT B. THOMPSON, a witness produced on the part of the defendants, and being duly sworn, testifies as follows:

Q. 1. What is your name, age, residence, and occupation?

A. Robert B. Thompson; age, 59 years; Elizabeth, New Jersey. Foundry and stove business and manufacturer.

Q. 2. How long have you been engaged in the stove business?

A. Between 35 and 40 years.

Q. 3. Did you at any time manufacture and sell, and if so, when, the McGregor stove with feeder?

154 A. It was twenty-two or twenty-three years ago.

Q. 4. Of what material was the fire-pot made for those stoves?

A. Of cast iron and brick.

Q. 5. What was the form of the inside of the fire-pot?

A. It was round or cylindrical.

Q. 6. Was it the same size at both ends?

A. No, sir.

Q. 7. Which end was the largest?

A. The upper end was the largest.

Q. 8. Did M. P. Dorsch at any time work for you on those stoves?

A. Yes, sir.

Q. 9. What part of those stoves did he make?

A. The sheet-iron part.

Q. 10. Look at the model, defendants' Exhibit No. 6, and state whether it is like or different from those stoves with the exception of the fire pot.

A. It is very much like the ones manufactured.

Cross-examination:

Q. 1. In how many pieces was the fire-pot cast?

A. One.

Q. 2. How much taper was given to it, and for what purpose?

A. I should say about half an inch or more, for the purpose of drawing it from the sand; and as heat discharges more freely, we naturally placed it with the largest end up, and as the feeder that supplied the fuel to the combustion-chamber could be placed higher up without emptying the coal over the sides of the fire-pot.

Q. 3. How many courses of fire cylinder brick did the fire-pot take?

A. Three, of four inches each.

Q. 4. Was the top course of the ordinary cylinder brick?

A. Yes, sir. In some cases we used round-top brick, but generally plain cylinder brick.

Q. 5. How long did you continue to manufacture these stoves?

A. Either two or three years.

156 Re-direct examination:

Q. 1. Was the inside of the pot when lined with fire-brick of the same size at the upper and lower ends?

A. It was not; the largest at the upper end.

ROBERT B. THOMPSON.

Subscribed and sworn to before me this 1st day of October, 1868.

[SEAL.] W'M H. BISHOP,

Notary Public and Examiner by consent.

WATSON SANFORD recalled.

Q. 1. Since your former examination, has a model been made under your direction to represent some of the car-stoves which were made and sold by you, and if yea, will you produce the model to be made an exhibit in this case?

A. I have, and "Exhibit No. 12" is the model.

Q. 2. When were stoves like the model marked defendants' Exhibit No. 12 made by you?

A. In 1850.

Q. 3. How many such were made and sold by you?

A. With the mica lights there were made from six to a dozen.

Q. 4. What was the form of the fire-pot to those stoves?

A. Tapering, the largest at the top by about two inches in diameter. It might have been three inches. Making the fire-pot largest at top gives a broader and better fire, I think; the depth of the fire-pot was, I think, about eight inches, because I lined some of them with two courses of brick.

Q. 5. What was the form of the feeder?

A. The upper part was straight and of sheet-iron and the lower end or nose tapering and of cast iron. I made the lower part tapering that in starting a fire the gases and smoke would pass by freely. I made these stoves for the Hudson River Railroad in 1850, running in 1851. They were not offered to the public through circulars but they
156 were for sale in the store. / I have made none since 1850 and 1851; have none of the patterns left, and do not know where any can be found.

W. SANFORD.

Subscribed and sworn to before me this 1st day of October, 1868.

[SEAL.] W'M H. BISHOP,

Notary Public and Examiner by consent.

APPAREILS DE CHAUFFAGE PAR M. WALKER.

Vol. XVI. France, Brevets D'Invention, 1854, Pl. XXXV, p. 267.

Fig. 12.

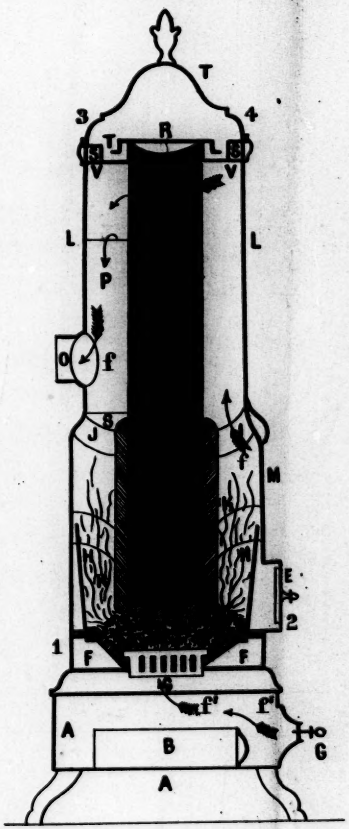


Fig. 13.

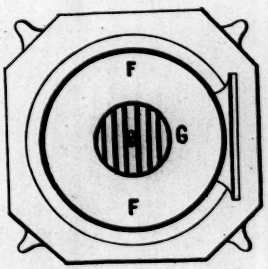


Fig 14.

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Page 160.

Fig. 15.

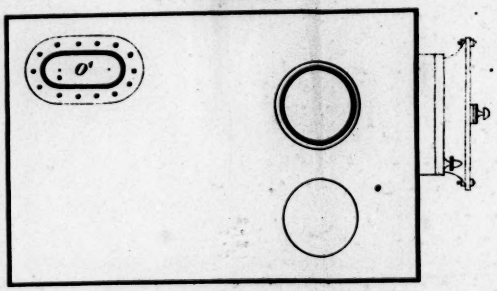
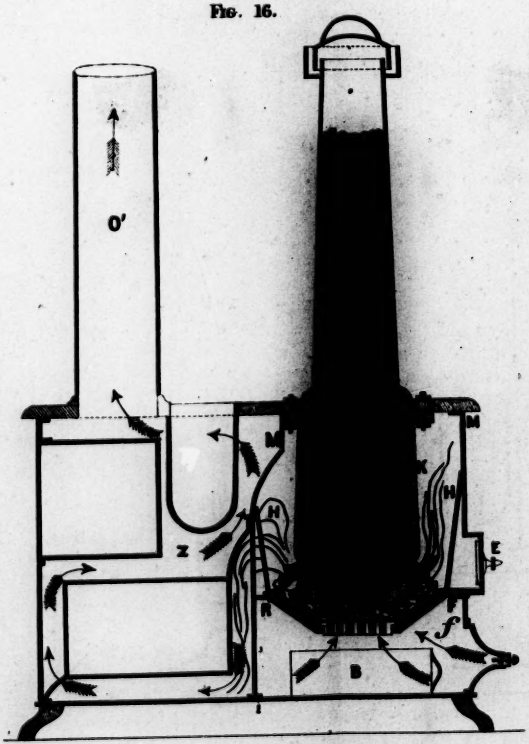


Fig. 16.



75

Fig. 15.

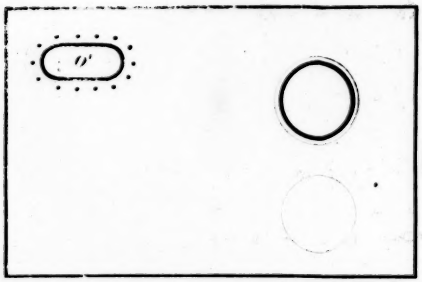
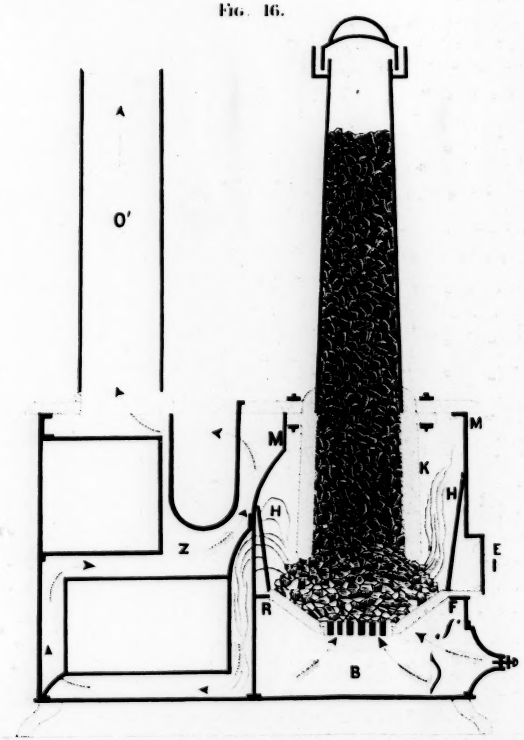


Fig. 16.



157 SOUTHERN DISTRICT OF NEW YORK,
City and County of New York, ss:

On the 11th, 12th, 23d, 24th, 25th, 26th, 28th, 29th, 30th days of September, and on the 1st day of October, 1868, personally appeared before me, Michael Bulger, J. C. Barnes, Jasper Van Wormer, J. J. Coyle, M. McGarvey, M. P. Dorsch, C. J. Shepard, W. Sanford, Samuel Pierpe and R. P. Thompson, the witnesses named in the foregoing depositions, who, after being duly sworn by me, gave the aforesaid testimony in answer to interrogatories and cross-interrogatories propounded to them by counsel for the respective parties in the suit named, wherein W'm Hailes and Ellen T. Treadwell are complainants, and Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes are defendants.

I also further certify that Joel Tiffany, esq., attended as counsel for the complainants, and Charles M. Keller, esq., attended as counsel for the defendants.

[SEAL.] W'M H. BISHOP,
Notary Public and Examiner by consent.

(Indorsed:) U. S. circuit court. In equity. Hailes & Treadwell vs. Van Wormer & others. Proofs received & filed Nov. 4, 1868.

158 DEFENDANTS' EXHIBIT No. 6*b*. *Walker's patent.*

Description of the machines and processes for which certificates of invention have been taken under the operation of the law of July 15, 1844, published by order of the minister of agriculture, commerce and public works, sixteenth volume, Paris, 1854, 4to. (Page 267.)

(Here follow two diagrams, marked pages 160 and 161.)

4644.—Patent of invention for 15 years, dated Sept. 12, 1849, to Mr. Walker, of Birmingham, England, for improvements in apparatus for heating.

These improvements which are the object of the patent and of a certificate additional, dated August 26, 1850, consist particularly in the arrangements of a bowl at the bottom surmounted by a conical hollow shaft, which may be completely filled with combustible materials and which has the advantage of feeding constantly the combustion without any need of attention, not only during a great many hours, but even if necessary during whole days.

These arrangements have so much the greater advantage that they can be adapted of every form and of every size, either to stoves to heat apartments both one or several rooms at a time, or to heaters, for heating large manufacturing establishments, or to furnaces for kitchens, shops where gilding, and the *the* manufacture of jewelry is carried on, or other factories.

They secure in all cases by the different applications of them a considerable economy in the consumption of combustible materials and do not demand for feeding or the care of the apparatus, any attention, labor, or inconvienance.

PLATE XXXV.

Figure 12 represents a vertical section made through the axis of a stove or heater.

Figure 13 is a horizontal projection made at the height of the line 1—2.

159 Figure 14 is a second horizontal section made in the upper part at the height of the line 3—4.

It is seen by these figures that the apparatus which I call hearth, or

self-feeding hearth, is composed of several distinct parts, among which I have especially to call attention to the bowl (bassin) or basin at the bottom A, which forms the hearth properly so called and the conical inner shaft K.

The basin F, which I suppose to be of cast iron, circular in form, might be constructed of some other metal or of any other form. At its centre it has a grate G, the bars of which are at convenient distances to give passage to the currents of air which come from the outside by opening the regulator C, applied in front and at the lower part of the base A, of the apparatus and where the ash-box is at B.

A covering or shirt on the inside, H, rises over the bowl, upon which it rests for the purpose of protecting the external covering M, and preventing it from burning. This external covering is provided on one side in front with a mineral glass or pane E, which allows one to see the flame or the fuel while ignited. It sustains on its upper base a similar shirt L, which may be of a smaller diameter, and which forms on the outside the complement of the stove or heater.

It is capable, like the first, of being more or less ornamental, according as the apparatus is to be used, either in rich apartments or in places less exposed to observation. A kind of bell or metallic covering closes in entirely on top and a hole on the side, O, for a pipe, is opened at the side to communicate with the chimney, which receives the smoke and the burnt gases arising from the combustion.

Above the basin F, which contains the burning coal, is the internal conical shaft K, of which I have spoken. This conical shaft, sustained in one direction by the covering H, and in the other by the crown in casing J, which joins the outer envelope M, to the upper one L, is completely filled with coke or coal at pleasure, which cannot burn up because there does not exist an inner current of air.

Thus, at its top it is closed by a hand-cover, R, the cylindrical edge of which enters into the throat T, of the diaphragm S, which is itself
162 filled with fine sand or any other powderous matter which has little affinity for conducting of heat. This circular diaphragm is pierced with oblong openings which allow of cleaning the inside of the apparatus without taking it to pieces by simply taking off the bell or upper cover. The form or size of these openings *are* clearly marked in the plan.

From what precedes, it is easy to understand how such an apparatus operates. It is sufficient first of all to fill the conical shaft K with combustibles, either of coke or coal, placing previously in the bowl or basin F some chips or other materials that will easily take fire, then to light them, and to close up the whole, opening to a certain extent the regulator C.

The flame produced by the combustion does not rise up in the interior of the side of the conical shaft, because it is completely closed at the top, and that in consequence no current exists there.

It is forced to spread itself at first along with the smoke in the covering H, from whence it rises rapidly in the covering M, and thence into the upper one, L, and from there it descends by the conduit P, into the pipe-opening O, which conducts it off into the draft-chimney. The smoke and the burnt gases resulting from the combustion then follow thus the direction indicated by the arrows *f*, while the cold air to feed the hearth enters by the opening of the regulator C, and penetrates under the grate G, following the direction of the arrows *f'*.

Gradually as the lower portion of the fuel is consumed, its place is immediately supplied by that which lies upon the top of it, until the conical shaft K is entirely emptied, which does not happen until after a con-

siderable long time. The combustion thus concentrated occurs in an extremely uniform manner, and consequently very economical, and a great degree of heat is obtained in the apartment, because all the caloric is perfectly well made use of.

The coke or coal in the conical shaft does not burn until it reaches the lower part, that is to say, to the basin F; still it might on account of not being very dry contain a little water, which would be reduced to vapour while the apparatus was in operation; in this case there
163 would be no inconvenience in making a small orifice at the side of the [illegible] of the conical shaft, so that this vapour might discharge itself in t[illegible]vering L, and pass with the smoke and burnt gases off into the draft-chimney.

We see then that this system fulfills all the conditions of economy of fuel and of solidity that can be desired, either for warming apartments or private houses, or for warming edifices and public establishments. It is easy also to make use of it in a multitude of other cases; for instance, for cooking-apparatus, like that which is drawn in figure' 16 and 17, of a vertical section, and of a plan seen from above. The arrangement of the hearth and of the conical shaft which form the essential part of the new system may be easily recognized, and it may be observed that the flame and the gas which escape from the combustion pass, after having circulated into the free space around the lower part of the conical shaft, into the space Z, which contains several separate places adapted to receive the vessels containing substances to be cooked or liquids to be heated. It is not until after the gases have circulated around these different vases that they escape by the draft-chimney O' placed parallel with the conical shaft.

It would evidently be the same with any other apparatus for heating, for cooking, or for furnace, that it should be desired thus to heat by my system of continuous self-feeding.

Defendant's Exhibit No. 7*b*.

Specification of the patent granted to William Harper, of Cowper's Court, Cornhill, in the city of London, patent stove manufacturer, and Thomas Walker, of Birmingham, in the county of Warwick, machinist, for improvements in stoves and grates. Sealed May 10, 1839. [With an engraving.]

To all to whom these presents shall come, etc., etc.:

Now know ye, that in compliance with the said proviso, we, the said William Harper and Thomas Walker, do hereby declare the nature of our said invention, and the manner in which the same is to be
164 performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawing hereunto annexed and to the figures and letters marked thereon, that is to say:

Our invention relates to a mode of applying a series of tubular flues to stoves and grates, whereby the heated vapors or products from the stove or grate are caused to ascend some of such tubular flues and enter a common chamber, and to descend down others; and further, the external surfaces of such series of tubular flues act as heating-surfaces to the air in the apartment, room, church, or other building wherein such stove or grate is employed.

Description of the Drawing.

Fig. 1 is a view in elevation of a stove or a grate constructed according to our invention.

Fig. 2 is a section of Fig. 1, whereby the nature of the internal arrangement of the parts will more readily be traced.

Fig. 3 is a plan in section of the series or cluster of tubes constituting the flues.

In each of these figures the same letters of reference indicate similar parts.

a a represents the lower portion of the stove or grate containing the fire-place. This lower portion consists of a quadrangular chamber, (or it may be of other convenient figure,) the front sides and back of which are of iron; *b* being the fire-place which contains the fuel, and we prefer the same to be lined with fire-brick, and we also prefer that there should be a space, *c*, between the fire-place and the metal of the outer surfaces, *a a*, though this is not essential, but it is desirable in order to cause the outer metal to be heated by the intervention of the heated air contained in the space *c*, surrounding the fire-place, and if it be desired there may be openings from the external atmosphere into the space *c*, and a suitable pipe or pipes to convey heated air from such space, *c*, into another room or place. We would, however, here remark that the arrangement and construction of the lower part of the stove or grate separately forms no part of our invention.

165 From the upper part of the stove or grate, *a a*, ascend' a series of tubes, *d d'*; the tubes *d* being ascending ways, and the tubes *d'* being the descending ways, through which the heated vapors pass to the chimney, and by this means a very extended surface is heated and becomes the heating means of the atmospheric air, in the room or place in which the stove or grate is placed, for it will be seen that the atmospheric air can circulate amongst the tubes *d d'*, and become heated by the external surfaces thereof. The series of tubes *d d'* enter into a chamber *e*, consequently the vapours, in passing from the fire-place, all ascend through the tubes *d* into the chamber *e*; and from that chamber, *e*, such heated vapours pass down the tube *d'* and enter the flue *f*, which may pass away at a point below the stove or grate, or at an intermediate point, as is indicated by the dotted lines, or even higher up. We would remark that the number of tubes *d d'* may be varied according to their size and the extent of heating apparatus desired to be obtained. *g* is a door or frame in front of the fire-place which is glazed with talc, and *h* is a small door to remove the ashes; the doors *g* and *h* should fit closely as possible to admit little air. *i i* are air-ways by which the supply of air to support combustion may be regulated; and it should be stated that when the stove is a close stove or grate, as above described, all parts should be as air-tight as possible to prevent air entering to support combustion except at the openings *i i*.

The fuel is supplied to the fire-place through the tube or way *j*, which has a cover, *k*, fitting into a circular groove or recess filled with sand; but whatever be the supply of fuel, the ignition will not ascend into the tube *j*, if the same be kept air-tight; and the fuel we prefer to burn is anthracite or stove coal, or coke of bituminous coal.

Having thus described our invention, we would have it understood what we claim as our invention is the mode herein described of applying a series of tubular flues and chamber *e* to stoves or grates.

In witness whereof, &c.

Enrolled November 9, 1839.

(Here follow two diagrams marked pages 166 and 167.)

No. 332 Hailes vs. Van Wormer

Page 166.

Fig. 1.

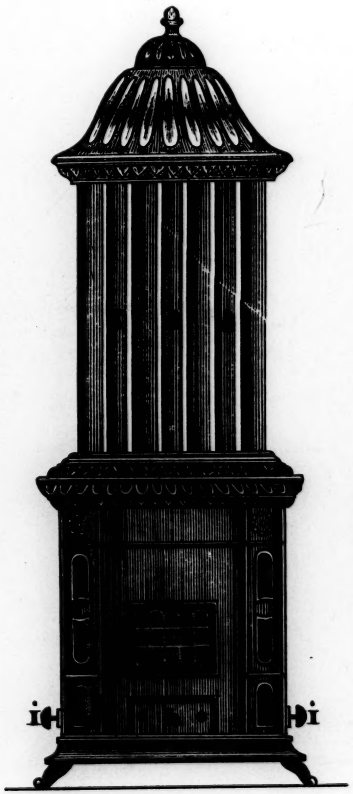


Fig. 2.

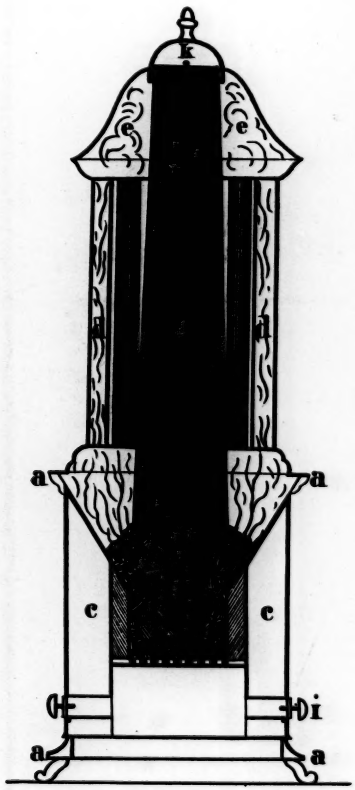


Fig. 2 is a section of Fig. 1, whereby the nature of the internal arrangement of the parts will more readily be traced.

Fig. 3 is a plan in section of the series or cluster of tubes constituting the flues.

In each of these figures the same letters of reference indicate similar parts.

a a represents the lower portion of the stove or grate containing the fire-place. This lower portion consists of a quadrangular chamber, (or it may be of other convenient figure,) the front sides and back of which are of iron; *b* being the fire-place which contains the fuel, and we prefer the same to be lined with fire-brick, and we also prefer that there should be a space, *c*, between the fire-place and the metal of the outer surfaces, *a a*, though this is not essential, but it is desirable in order to cause the outer metal to be heated by the intervention of the heated air contained in the space *c*, surrounding the fire-place, and if it be desired there may be openings from the external atmosphere into the space *c*, and a suitable pipe or pipes to convey heated air from such space, *c*, into another room or place. We would, however, here remark that the arrangement and construction of the lower part of the stove or grate separately forms no part of our invention.

165 From the upper part of the stove or grate, *a a*, ascend' a series of tubes, *d d'*; the tubes *d* being ascending ways, and the tubes *d'* being the descending ways, through which the heated vapors pass to the chimney, and by this means a very extended surface is heated and becomes the heating means of the atmospheric air, in the room or place in which the stove or grate is placed, for it will be seen that the atmospheric air can circulate amongst the tubes *d d'*, and become heated by the external surfaces thereof. The series of tubes *d d'* enter into a chamber *e*, consequently the vapours, in passing from the fire-place, all ascend through the tubes *d* into the chamber *e*; and from that chamber, *e*, such heated vapours pass down the tube *d'* and enter the flue *f*, which may pass away at a point below the stove or grate, or at an intermediate point, as is indicated by the dotted lines, or even higher up. We would remark that the number of tubes *d d'* may be varied according to their size and the extent of heating apparatus desired to be obtained. *g* is a door or frame in front of the fire-place which is glazed with talc, and *h* is a small door to remove the ashes; the doors *g* and *h* should fit closely as possible to admit little air. *i i* are air-ways by which the supply of air to support combustion may be regulated; and it should be stated that when the stove is a close stove or grate, as above described, all parts should be as air-tight as possible to prevent air entering to support combustion except at the openings *i i*.

The fuel is supplied to the fire-place through the tube or way *j*, which has a cover, *k*, fitting into a circular groove or recess filled with sand; but whatever be the supply of fuel, the ignition will not ascend into the tube *j*, if the same be kept air-tight; and the fuel we prefer to burn is anthracite or stove coal, or coke of bituminous coal.

Having thus described our invention, we would have it understood what we claim as our invention is the mode herein described of applying a series of tubular flues and chamber *e* to stoves or grates.

In witness whereof, &c.

Enrolled November 9, 1839.

(Here follow two diagrams marked pages 166 and 167.)

No. 332 Hailes vs. Van Wormer

Page 166.

Fig. 1.

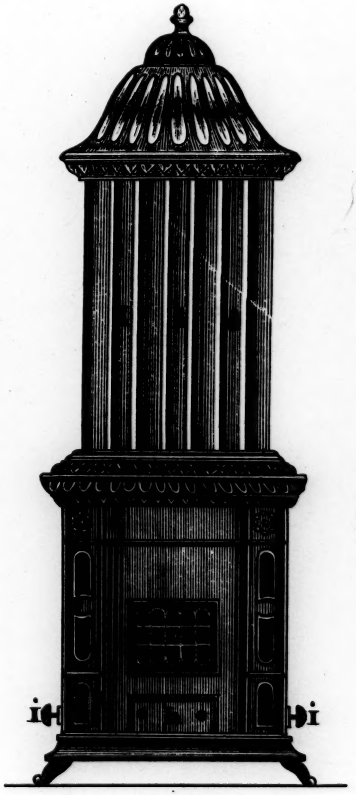
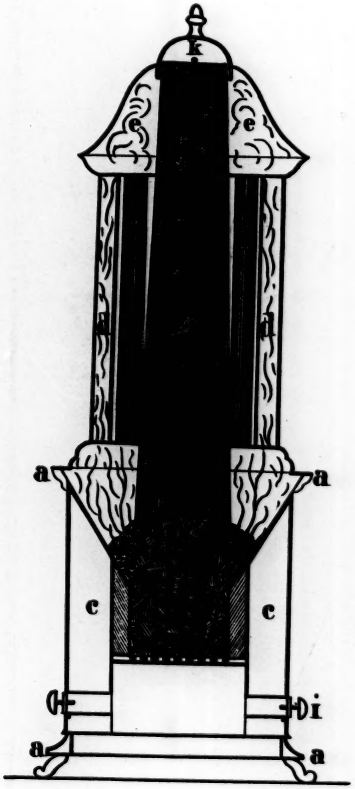


Fig. 2.



No. 332 Hailes v.s. Van Wormer

Page 167

TRANSVERSE SECTION OF
FIGS. 1 AND 2.

FIG. 3.

From "The Repertory of Patent Inventions, New Series, Vol. 15, 1840, London.

168 DEFENDANT'S EXHIBIT No. 8*b*.

The United States Patent-Office, to all persons to whom these presents shall come, greeting:

This is to certify, that the annexed is a true copy from the records of this Office of the letters-patent granted to James MacGregor, jr., January 7, 1846, No. 4350.

In testimony whereof, I, Elisha Foot, Commissioner of Patents, have caused the seal of the Patent-Office to be hereunto affixed, this first day of September, in the year of our Lord one thousand eight hundred and sixty-eight, and of the Independence of the United States the ninety-third.

[SEAL.] ELISHA FOOTE.

No. 4350.

The United States of America, to all to whom these letters-patents shall come:

Whereas James MacGregor, jr., Wilton, New York, has alleged that he has invented a new and useful improvements in stoves for heating apartments, which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

169 These are therefore to grant according to law to the said James MacGregor, jr., his heirs, administrators, or assigns, for the term of fourteen years from the twenty-second day of December, one thousand eight hundred and forty-five, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said James MacGregor, jr., in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent-Office has been hereunto affixed.

Given under my hand, at the city of Washington, this seventh day of January, in the year of our Lord one thousand eight hundred and forty-six, and of the Independence of the United States of America the seventieth.

[L. S.] JAMES BUCHANAN,
Secretary of State.

Countersigned and sealed with the seal of the Patent-Office.

EDMUND BURKE,
Commissioner of Patents.

The schedule referred to in these letters-patent, and making part of the same.

To all to whom these presents shall come:

Be it known that I, James MacGregor, jr., of Wilton, in the county of Saratoga, and State of New York, have invented new and useful im-

provements in stoves for heating apartments, and that the following is a full, clear, and exact description of the principle or character thereof which distinguishes them from all other inventions for the same purpose before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings
170 making part of this specification, in which figure 1 is a front elevation of the stove, and figure 2 a longitudinal vertical section of the same taken at the line (*x*, *x*) of figure 1. The same letters indicate like parts in all the figures.

In all stoves heretofore made much fuel has been wasted in consequence of the escape into the chimney of combustible and incombustible gases at high degrees of temperature, and to obviate this, various devices have been suggested, most of which are of a very complex and expensive nature, such as a series of pipes for the circulation of the products of combustion before escaping into the chimney, but the most effective heretofore known is the air-tight stove, patented by Isaac Orr, which is seriously objected to on account of the explosions which take place within the stove, as it is necessary to close up all the apertures to and from the fire-chamber to prevent the escape of combustible gases, and all the products of combustion at too high a degree of temperature, and the consequent waste of fuel. To obviate these defects, I make the aperture for the escape of the products of combustion in the back part of the bottom plate of the fire-chamber, or in any other part of the fire-chamber, not, however above the door for the admission of fuel and air, so that the products of combustion shall circulate freely within the chamber of combustion above the fire to insure the entire combustion of all combustible matter, and then escape into the chimney through the flue-space in or near the bottom, there being a passage for air under the bottom plate of the fire-chamber, passing by and communicating with the flue-space leading from the fire-chamber, and thence extending to the pipe or chimney, the said air-passage being provided with a sliding register or valve at the forward part to regulate the supply of air, and draft and ventilate the room. In the accompanying drawings (*a*) represents the outer case of the stove, which can be of any desired form, with a fire-chamber (*b*) of considerable capacity for the circulation of the products of combustion within it; and with a bottom plate (*c*) for the reception of wood or other appropriate combustible. Towards the back part of this bottom plate there is a flue hole or space (*d*) for the
171 escape of the products of combustion into the chimney (*e*,) and to prevent the fuel from falling through, the aperture is covered with a grating, (*f*.) The door (*g*) for fuel should be made to fit accurately, and is to extend down to the bottom plate with a small draught shutter or valve (*h*) at or near the bottom. Under the bottom plate there is a passage (*i*) which extends from the front of the stove to the pipe or chimney, and into which the aperture for the escape of the products of combustion opens so that the gases, etc., are carried by the current of air that enters this passage into the chimney, and for this purpose of regulating the supply of air to the passage, it is provided with a sliding register or damper, (*k*.)

From this description it will be obvious that the hole or flue space for the escape of the products of combustion, instead of being made in the bottom plate can be made near the bottom, and pass into a vertical pipe or chimney, and it may also be a continuation of the air-passage above described. The aperture or flue (*d*) may be provided with a damper, (*t*,) but this is by no means important, if the aperture be of the proper size, but to regulate this is the chief use of the damper.

JAMES Mc GREGOR, JR.

Improvement in Stoves for Heating Apartments.

(Patented January 7th, 1846.)

Fig. 1.

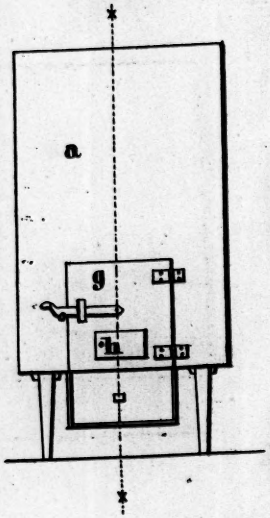


Fig. 2.

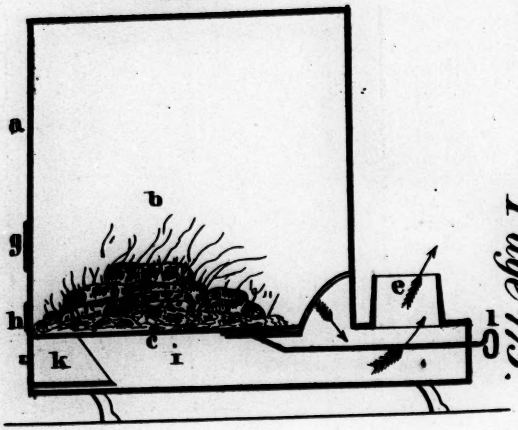
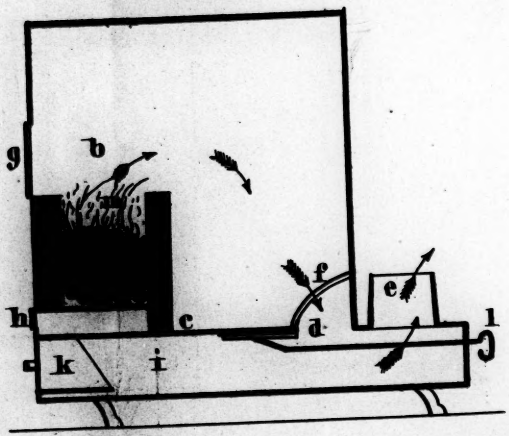


Fig. 3.



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Page 113.

From the foregoing it will be obvious that the products of combustion will not escape from the fire-chamber until after they shall have circulated freely in the chamber, and the combustible gases have been fully consumed by admixture with atmospheric air, and that the combustion can be regulated and the draught facilitated by the air-passage below, and passing by the aperture or flue space, (*d*,) and that, in consequence of this connection between the fire-chamber and the air-passage, an explosion cannot take place within the stove.

The application of this stove to the burning of coal is fully represented in figure 3, which is a vertical section thereof, in which (*m*) represents a fire-pot and grate above the bottom plate (*c*) with the door (*g*) for the introduction of the coal above the fire-pot, the small draught shutter or valve (*h*) being placed below it, but above the bottom plate, and the aperture or flue space (*d*) for the escape of the products of
172 combustion bearing the same relations to this, and all the other parts of the stove as when applied to the wood-stove.

What I claim as my invention and desire to secure by letters-patent, is making the aperture for the escape of the products of combustion in or near the bottom, (not under the fuel,) and below the upper edge of the door, for the purpose and in the manner described. And I also claim the air-passage below the fire-chamber and connecting with the fire chamber and escape-pipe or chimney by the aperture for the escape of the products of combustion, for the purpose and in the manner described.

JAMES MACGREGOR, JR.

Witnesses:
CHAS. M. KELLER.
A. P. BROWNE.

(Here follows diagram marked page 173.)

174 DEFENDANTS' EXHIBIT No. 9*b*.

The United States Patent-Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this Office of the letters-patent granted to S. B. Sexton, April 19, 1859, No. 23716.

In testimony whereof I, Elisha Foote, Commissioner of Patents, have caused the seal of the Patent-Office to be hereunto affixed this first day of September, in the year of our Lord one thousand eight hundred and sixty-eight, and of the independence of the United States the ninety-third.

[SEAL.] ELISHA FOOTE.

No. 23716.

The United States of America to all to whom these letters-patent shall come:

Whereas S. B. Sexton, of Baltimore, Maryland, has alleged that he has invented a new and useful improvement in stoves, which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief,

been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said S. B. Sexton, his heirs, administrators, or assigns, for the term of fourteen
175 years from the nineteenth day of April, one thousand eight hundred and fifty-nine, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said S. B. Sexton in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent-Office has been hereunto affixed.

Given under my hand, at the city of Washington, this nineteenth day of April, in the year of our Lord one thousand eight hundred and fifty-nine, and of the Independence of the United States of America the eighty-third.

JACOB THOMPSON,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent-Office.
[L. S.]
S. T. SHUGERT,
Acting Commissioner of Patents.

The schedule referred to in these letters-patent and making part of the same.

To all whom it may concern:

Be it known that I, S. B. Sexton, of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and useful improvement in stoves, and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing forming part of this specification, in the several figures of which, similar characters of reference denote the same part.

Figure 1 is a front elevation of stove.

Figure 2 is a vertical longitudinal section of the same.

Figure 3 is a perspective view, showing cold-air chamber.

My invention consists in a certain combination of parts hereinafter to be set forth, constituting an improvement in cylinder stoves constructed with a covered fuel-chamber reaching nearly to the grate,
176 so as to furnish a continued supply of fuel to support combustion in the fire-chamber below and exterior to the said fuel-cylinder. The object of this improvement being to combine with this construction increased radiating surface, and facilities for warming apartments above the location of the stove, while all the advantages of the peculiar construction as applied to a single cylinder are retained. The entire combination being ornamental and well adapted for the purposes above stated.

In the drawing, A is the central apartment of the stove containing the fire-chamber F, and the covered fuel-chamber H. On each side of this chamber F is a chamber B B′, connected with the cylinder or central chamber by pipes C and D, and in communication with each other by lower flue E. In the right-hand chamber is a damper *a*, and in pipe D a damper *b*. The exit flue *f* is over chamber B′.

S. B. SEXTON'S Improvement in Stoves.

(Patented April 19, 1859, No. 23,716).

Fig. 1.

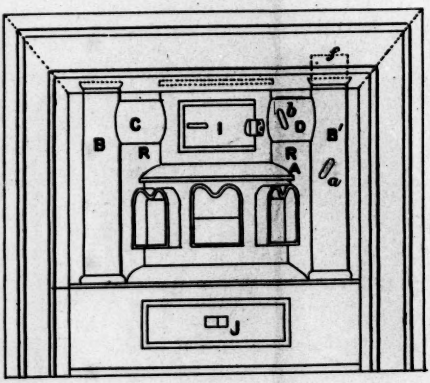


Fig. 3.

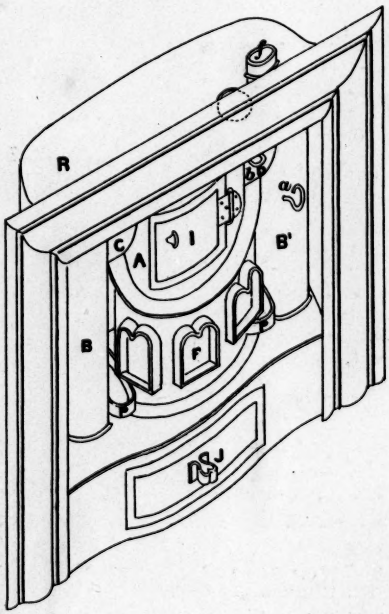
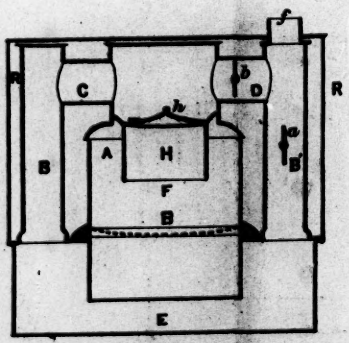


Fig. 2.



ound the back portion of the aforesaid chambers is a casing, R, ning an air-chamber in which the heat of the three chambers A, B, as the effect of warming air which is conveyed into an upper apart- t by a flue leading from the top of the chamber.

he closing of damper *a* and opening of damper *b* permits the imme- te exit of the products of combustion, and the closing of damper *b* l opening of *a* causes the draft to pass downward through chamber and upward through the chamber B′.

Cold air passes into chamber R from the rear, and also from the front twwen the chambers A and B B′.

Between the chambers are the water-pans *p* for the evaporation of ie water to furnish moisture to the air.

I do not claim any of the parts of this stove separately considered. ut I claim the covered fuel-cylinder H in combination with the cham- rs A B B′, flues C and D, and dampers *a* and *b*, together with the rear sing R constituting a cold-air chamber; the arrangement being as set rth.

In testimony whereof I hereunto set my hand before two witnesses.

S. B. SEXTON.

Witnesses:
SAM'L MCCOY.
JNO. A. PIFFER.

(Here follows diagram marked page 177.)

178 DEFENDANT'S EXHIBIT No. 10 *b*.

The United States Patent-Office to all persons to whom these presents shall come; greeting:

This is to certify, that the annexed is a true copy from the records of this Office of the re-issued letters-patent granted to S. B. Sexton, Dec. 3, 1861, No. 1242.

In testimony whereof I, Elisha Foote, Commissioner of Patents, have caused the seal of the Patent-Office to be hereunto affixed this first day of September, in the year of our Lord one thousand eight hundred and sixty-eight, and of the Independence of the United States the nine- ty-third.

[SEAL.] ELISHA FOOTE.

Re-issue, No. 138. Whole No. 1242.

The United States of America to all to whom these letters-patent shall come:

Whereas, S. B. Sexton, of Baltimore, Maryland, has alleged that he has invented a new and useful improvement to stoves, (for which let- ters-patent were issued to him dated April 19th, 1859, which letters hav- ing been surrendered by him, the same have been canceled and new let- ters ordered to issue to him on an amended specification,) which he states has not been known or used before his application; has made oath that he is a citizen of the United States, that he does verily be- lieve that is the original and first inventor or discoverer of the said im- provement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an ex-

No. 332. Hailes vs. Van Wormer Page 177.

clusive property in the said improvement, and praying that a patent may be granted for that purpose:

179 These are therefore to grant, according to law, to the said S. B. Sexton, his heirs, administrators, or assigns, for the term of fourteen years from the nineteenth day of April, one thousand eight hundred and fifty-nine, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said S. B. Sexton, in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent-Office has been hereunto affixed.

Given under my hand, at the city of Washington, this third day of December, in the year of our Lord one thousand eight hundred and sixty-one, and of the Independence of the United States of America the eighty-sixth.

CALEB B. SMITH,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent-Office.
[L. S.] D. P. HOLLOWAY,
Commissioner of Patents.

The schedule referred to in these letters-patent, and making part of the same.

To all whom it may concern:

Be it known that I, S. B. Sexton, of Baltimore, in the county of Baltimore, and State of Maryland, have invented a new and useful improvement in stoves, and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a front elevation of a stove, illustrating my invention.

Figure 2 is a vertical, longitudinal section of the same.

180 Figure 3 is a perspective view of the same, exhibiting the location of the cold-air chamber hereinafter referred to.

Similar letters of reference indicate corresponding parts in the several figures.

The leading feature of novelty in this invention consists in the use of a fuel-supply chamber, so supported within or above the fire-box that the points of attachment shall be out of contact with the burning fuel, and the lower end of the supply-chamber out of contact with the walls of the stove, and a free circulation of the products of combustion be permitted around and above the supply-chamber.

The invention also consists in certain combinations of parts producing increased radiating surface, and facilities for warming apartments above the location of the stove.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the central apartment of the stove, containing the fire-chamber F, and a fuel-chamber H, of any suitable form, the latter being attached to the upper part or walls of the stove in such manner as to allow a free circulation of air above, below, and around it. On each side of the central apartment is a chamber B B′, connected with the upper portion of the apartment A, by flues C and D, and communicating with each other beneath by a flue E. In the chamber B′ is damper *a*, and

in the flue D is a damper *b*. The exit-pipe *f* communicates with and ascends from the upper end of the chamber B′.

Around the back portion of the aforesaid chambers is a casing R, forming an air-chamber, in which heat from the three chambers A, B, B′, is imparted to a body of air, which is conveyed by a suitable flue into any upper apartments which it is desired to heat. *h* represents a cover which may be applied to the fuel-chamber after the fire is kindled. G is the grate, I is the door through which fuel is introduced to the supply-chamber H. I is an ash-drawer of common construction; *p p* are evaporating-pans for water, to supply moisture to the air.

The most advantageous manner of using this stove is as follows:

181 To kindle the fire the damper *b*, the door I, and the draught-door in the ash-drawer are opened, the cover *h* removed, and a plentiful supply of kindling placed on the grate G, beneath the chamber H. The kindling being ignited, a moderate supply of coal is introduced, and the door I closed. The draught being now directly upward, through the chambers F and H, and the flue D, the coal is in a short time thoroughly ignited. The door I is then again opened, the chamber H completely filled with coal, the cover *h* replaced, and the door I again shut. When this coal is sufficiently ignited, the damper *b* is closed. The fuel thus contained in the chambers F and H will support combustion for from twelve to twenty-four hours, and by additional supplies to the chamber H, the fire may be kept up indefinitely. The coal within the supply-chamber H becomes heated ready for use, and any gases evolved thereby are carried downward, through the chamber F, and thoroughly consumed. The coal in the chamber F being perfectly incandescent, evolves the greatest possible amount of heat, and presents a brilliant and cheerful appearance, through windows in the external walls. As it burns down, it is constantly replenished at the centre from the chamber H, without any waste. The products of combustion ascend around the outside of the chamber H, and pass through the flues C, B, E, and B′, to the exit-flue *f*, the heat being regulated as occasion requires by means of the damper *d*, and the draught in the ash-drawer.

Cold air passes into the chamber R from the rear, and also from the front, between the chambers A and B, B′.

It will be evident that the cover of the fuel supply-chamber is not essential to my invention. Without it the suspended supply-chamber, though operating to much less advantage, will still be of great utility in holding the newly inserted and partially consumed coal, and causing the lower and outer chamber F to be occupied by a constantly incandescent mass.

A great advantage in my invention consists in the absence of supports beneath the chamber H, which supports interfere with the proper motion of the fuel, and obstruct the working and cleansing of the stove in various ways.

182 My improved stove, with the peculiar features of superiority above described, retains all the advantages of an analogous construction applied to single-cylinder stoves. It is also highly ornamental, and possess' great heating-power, by reason of the most active combustion taking place in its exterior portion.

I do not restrict myself to any specific number of dampers or chambers, or flues, nor to the particular location of the cold-air chamber. Neither do I limit myself to the exact arrangement of the various parts, so long as the effect and principle of operation be not essentially departed from.

But having thus described my invention, what I claim as new and desire to secure by letters-patent is:

A fuel-supply chamber suspended within or above the fire-box, with its lower end out of contact with the latter, by connections which shall be out of contact with the burning fuel, and shall permit the free circulation of gases around and above the supply-chamber.

I also claim, as my invention, a cold-air chamber, combined in any manner substantially as herein described, with a fuel-supply chamber H, so applied as to permit the passage of the products of combustion around and above it.

I also claim the combination of the main chamber A, fuel-chamber H, flues C, B, E, B′, and D, and damper *b*, arranged and operating substantially as hereinbefore explained.

S. B. SEXTON.

Witnesses:
SAM'L MCCOY.
JAMES B. HINDES.

Ex'd A. T.

(The drawings annexed to this exhibit are the same as those annexed to Exhibit 9*b*, which see.)

183 DEFENDANTS' EXHIBIT NO. 11*b*.

The United States Patent-Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters-patent granted to Joseph C. Henderson May 29, 1860, No. 28482.

In testimony whereof I, Elisha Foote, Commissioner of Patents, have caused the seal of the Patent-Office to be hereunto affixed, this first day of September, in the year of our Lord one thousand eight hundred and sixty-eight, and of the Independence of the United States the ninety-third.

[SEAL.] ELISHA FOOTE.

No. 28482.

The United States of America to all to whom these letters-patent shall come:

Whereas, Joseph C. Henderson, of Albany, New York, has alleged that he has invented a new and useful improvement in stoves, which, he states, has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said Joseph
184 C. Henderson, his heirs, administrators, or assigns, for the term of fourteen years from the twenty-ninth day of May, one thousand eight hundred and sixty, the full and exclusive right and liberty

of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Joseph C. Henderson in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent-Office has been hereunto affixed.

Given under my hand, at the city of Washington, this twenty-ninth day of May, in the year of our Lord one thousand eight hundred and sixty, and of the Independence of the United States of America the eighty-fourth.

JACOB THOMPSON,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent-Office.
[L. S.] PHILIP F. THOMAS,
Commissioner of Patents.

The schedule referred to in these letters-patent and making part of the same.

To all whom it may concern:

Be it known that I, Joseph C. Henderson, of the city and county of Albany, in the State of New York, have invented, made, and applied to use certain new and useful improvements in stoves; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing making part of this specification, wherein—

Figure 1 is a vertical section of my improved stove;

Figure 2 is a front elevation of a portion of the same; and—

Figure 3 is a plan of the grate.

Similar marks of reference denote the same parts.

185 Several instances are known of in which the fuel has been placed in a hopper or receptacle above the grate, so as to supply the fire as the coal was consumed. Such a plan is particularly advantageous in preventing the fire being deaden'd by too much coal put on at one time, and also as preventing the fire burning out too fast from lack of fuel. In all instances, however, with which I am acquainted, one of two difficulties, or both, arise, viz, the fuel ignites in the hopper or receptacle from the great heat and confined position, or else the gases passing off from the mass are entirely lost and unconsumed from lack of oxygen, as said gases are generated above the fire.

The nature of my said invention consists in admitting a current of air to pass through a casing or chamber between the fire and the supply of coal, said current of air coming out into the fire above the grate, so that by said chamber and current of air I effect three objects: first, said air tends to keep the supply of coal as cool as possible; second, the air in so doing becomes heated and better adapted to supporting combustion; and, third, said air passing off into the fire-chamber near where the supply of coal unites with the fire, combines with the gaseous matters evolved from the coal, rendering the combustion perfect, and preventing the waste of these gaseous substances in consequence of the absence of oxygen.

In the drawing *a* is the fire place; *b* the casing or plates; *c* the ash-drawer; *d* the escape or smoke-pipe; all of which may be made of any desired size, shape, or character; *e* is a hopper into which the fuel is entered by the door *f*; *g* is an air-space between said hopper and

the fire, terminating at the opening *h h*; and *i* is a register to admit a regulated supply of air to the fire through said space. I have represented my hopper *e* as circular or conical, and directly over the centre of the grate *k*; but it will be evident that the shape of this hopper might vary according to the character of the stove. In all instances, the air in passing through the supply of fuel and the fire acts to keep the said fuel as cool as possible, and pass in a heated state into the fire at the point so necessary for perfect combustion, because said heated air comes directly in contact with the gaseous matters
186 evolved from the fresh coal as it passes down to supply the fire.

By this mode of supplying fuel I avoid many difficulties that arise, particularly with soft coal in stoves, wherein it has been found practically that a supply of fresh coal deadens the fire down; the parts become cool; the gaseous matters thrown off, instead of inflaming, are in the form of smoke, condensing on and becoming thick soot around the stove; and when these matters are thrown off and the fire commences to burn briskly, the stove is apt to be forgotten until the coal is almost consumed, and then a fresh supply repeats the difficulty; and with anthracite coal the addition of considerable at one time is apt, on account of the heat acting on the whole mass, to evolve sulphurous fumes, which are detrimental to health, and all benefits from the same in combustion are lost.

By the use of my feeder and air-supply, all the foregoing difficulties are entirely removed and the fire kept constant and uniform with either soft or hard coal, and all loss of gaseous matters or obstruction to the stove *are* prevented, and the addition of large quantities of coal at one time does not dampen, check, or obstruct the fire.

The cone *l* is introduced around my hopper, and the gases pass out from the opening *m*, the object of this being to retain heat and ensure a perfect combustion, the same as in my patent of May 18, 1858.

The grate *k* is formed of a series of hollow triangular bars, as shown in Figure 3, there being a row of holes in each bar, the object being to prevent the grate becoming heated and burnt out, and preventing the obstruction of the draft by ashes; for the ashes settle down between the bars on the inclined sides of the same, protecting the grate, while the air passes through the holes at the top of the bar into the fire, and said draft is heated by contact with said grate-bar in passing through it.

If the air space *g* was dispensed with, and fire-brick substituted, the operation of the parts would be analogous, if air was admitted within the chamber above the fire from some other openings.

In Figure 4 I have represented the mode in which I have contemplated the application of my invention to cooking-stoves. In this
187 case the operation of each part corresponds with that of the parts in Figure 1 and 2, having the same letter of reference; and *o* represents the oven, and *p* an air-space between the oven and fire.

The great advantage of this invention, as applied to the furnace of a cooking-stove, range, heater, or boiler of any character, will be apparent, for the soft coal, (with which my invention is specially useful,) being contained in the hopper *e*, gradually heats and cokes, and the gaseous products pass off therefrom into the fire-chamber *a*, over the incandescent fuel, and being detained by the contraction at *q*, are thoroughly combined with the oxygen of the air and inflamed, so that no smoke passes away, only the gaseous products of a perfect combustion. The coal may be pushed down from time to time as the fire burns away, and the fresh coal added does not cool the stove or deaden the fire, but

J. C. HENDERSON, Improvement in Stoves.

(Patented May 29, 1860, No. 28,482.)

FIG. 1.

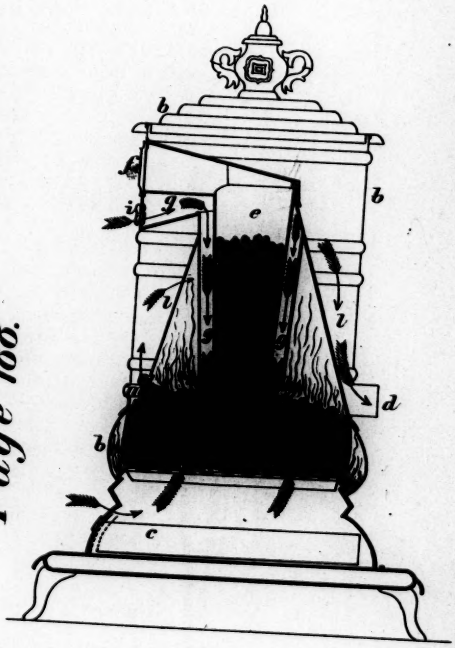


FIG. 2.

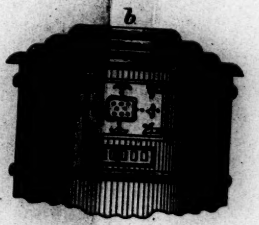
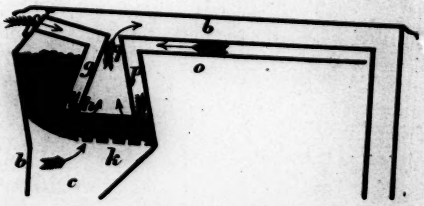


FIG. 3.

FIG. 4



No. 332. Hailes vs. Van Wormer. Page 188.

there is an uniform combustion and steady heat, free from the smoke and soot heretofore existing where soft coal was used.

It will be seen that my present invention is additional to that set forth in my patent of May 18, 1858, and extends the application thereof and its practical efficiency.

Having thus described my said invention, I remark that I do not claim a hopper or feeder supplying coal to fire, as that is well known, but—

What I claim and desire to secure by letters-patent is the air-space *g*, for a descending draft between the fuel-hopper and the combustion-chamber, said draft entering the combustion-chamber at the lower end of said air-space, as set forth, whereby the descending draft keeps the hopper cool and enters the combustion-chamber in a heated state, as specified.

I claim the combination of a hopper for feeding the fuel with a cone *l*, or contracted chamber, (as at *q*,) for detaining the products of combustion, and retaining a sufficient heat for ensuring perfect combustion as set forth.

In witness whereof I have hereunto set my signature this 3d day of April, 1860.

J. C. HENDERSON.

Witnesses:
SAMUEL W. TERRELL.
THO'S GEO. HAROLD.

(Here follows diagram marked page 188.)

189 DEFENDANTS' EXHIBIT No. 12*b*.

The United States Patent-Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the re-issued letters-patent granted to Joseph C. Henderson, June 30, 1863, No. 1506.

In testimony whereof, I, Elisha Foote, Commissioner of Patents, have caused the seal of the Patent-Office to be hereunto affixed, this first day of September, in the year of our Lord one thousand eight hundred and sixty-eight, and of the Independence of the United States the ninety-third.

[SEAL.] ELISHA FOOTE.

Re-issue No. 1506.

The United States of America to all to whom these letters-patent shall come:

Whereas Joseph C. Henderson, of Albany, New York, has alleged that he has invented a new and useful improvement in stoves, (for which letters-patent were issued to him, dated May 29th, 1860, which letters having been surrendered by him, the same have been cancelled, and new letters ordered to issue to him on an amended specification,) which, he states, has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury

of the United States the sum of thirty dollars, and presented a
190 petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said Joseph C. Henderson, his heirs, administrators, or assigns, for the term of fourteen years from the twenty-ninth day of May, one thousand eight hundred and sixty, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Joseph C. Henderson in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent-Office has been hereunto affixed.

Given under my hand, at the city of Washington, this thirtieth day of June, in the year of our Lord one thousand eight hundred and sixty-three, and of the Independence of the United States of America the eighty-seventh.

J. P. USHER,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent-Office.
[L. S.] D. P. HOLLOWAY,
Commissioner of Patents.

The schedule referred to in these letters-patent, and making part of the same.

To all whom it may concern:

Be it known that I, Joseph C. Henderson, of the city and county of Albany, in the State of New York, have invented, made, and applied to use certain new and useful improvements in stoves; and I do hereby declare that the following is a full, clear, and exact description of
191 the construction and operation of the same, reference being had to the annexed drawing making part of this specification, wherein—

Fig. 1 is a vertical section of my improved stove.

Fig. 2 is a front elevation of a portion of the same.

Fig. 3 is a plan of the grate.

Similar marks of reference denote the same parts.

Several instances are known of in which the fuel has been placed in a hopper or receptacle above the grate, so as to supply the fire as the coal was consumed; such a plan is particularly advantageous in preventing the fire being deadened by too much coal put on at one time, and also as preventing the fire burning out too fast from lack of fuel.

In all instances, however, with which I am acquainted one or two difficulties, or both, arise, viz, the fuel ignites in the hopper or receptacle from the great heat and confined position, or else the gases passing off from the mass are not perfectly consumed, because they are not retained in contact with the heat of the fire to produce perfect combustion.

The nature of my said invention consists in a hopper that is located above the fire-pot, and supplies coal to the fire; and over the fire and around the base of the hopper a chamber is formed in which the gases are detained and subjected to sufficient heat to produce a perfect combustion; and I make use of a circulating current of air around the hopper to keep the fuel as cool as possible and prevent combustion in the

hopper, and I introduce a current of air through the hollow lower edge of the hopper to effect the two-fold operation of keeping the hopper cool and preventing it burning out at this point, and of supplying a hot blast to the fire at the surface of the incandescent fuel to promote a perfect combustion of the gases evolved from the said fuel.

In the drawings, *a* is the fire-pot; *b* the casing or plates; *c* the ash-drawer; *d* the escape or smoke-pipe, all of which may be of any desired size, shape, or character; *e* is a hopper into which the fuel is placed; *f* is the supply-door for the fuel; *g* is an air-space between said hopper and the fire, terminating at the openings *h*, *h*; and *i* is a register to admit a regulated supply of air to the fire through said space.

192 I have represented my hopper *e* as circular or conical, and directly over the centre of the grate *k*, but it will be evident that the shape of this hopper might vary according to the character of the stove; in all instances the air in passing around the hopper acts to keep the said fuel as cool as possible, and by carrying said air into the fire in a heated state the combustion becomes more perfect, because said heated air comes directly in contact with the gaseous matter evolved from and rising above the fuel.

The cone *l* is introduced around my hopper, forms a combustion-chamber or horizontal flue, the object of this being to retain the gases in the presence of the fire-heat and insure a perfect combustion similar to that set forth in my patent of May 18, 1858.

By this mode of supplying fuel I avoid many difficulties that arise, particularly with soft coal in stoves, wherein it has been found practically that a supply of fresh coal deads the fire, the parts become cool; the gaseous matters thrown off, instead of inflaming are in the form of smoke, condensing on and becoming thick soot around the stove, and when these matters are thrown off and the fire commences to burn briskly, the stove is apt to be forgotten until the coal is almost consumed, and then a fresh supply repeats the difficulty, and with anthracite coal the addition of considerable at one time is apt, on account of the heat acting on the whole mass, to evolve sulphurous fumes, which are detrimental to health, and all benefits from the same in combustion are lost.

By the use of my feeder and air-supply, all the foregoing difficulties are entirely removed, and the fire kept constant and uniform with either soft or hard coal, and all loss of gaseous matters or obstruction to the stove are prevented, and the addition of large quantities of coal at one time does not dampen, check, or obstruct the fire.

The grate *k* is formed of a series of hollow triangular bars, as shown in Fig. 3, there being a row of holes in each bar, the object being to prevent the grate becoming heated and burn out, and preventing the obstruction of the draft by ashes, for the ashes settle down between the bars on the inclined sides of the same, protecting the grate, while the air passes through the holes at the top of the bar into the fire, and

193 said draft is heated by contact with said grate-bar in passing through it.

If the air-space *g* was dispensed with, and fire-brick substituted, the operation of the parts would be analogous if air was admitted within the chamber above the fire from some other opening.

In Fig. 4 I have represented the mode of which I have contemplated the application of my invention to cooking-stoves; in this case the operation of each part corresponds with that of the parts in Fig. 1 and 2, having the same letters of reference, and *o o* represents the oven, and *p* an air-space between the oven and the fire. The great advantage of this invention, as applied to the furnace of a cooking-stove, range,

ter, or boiler of any character, will be apparent, for the soft coal
th which my invention is especially useful) being contained in the
per *e*, gradually passes into the fire and heats and cokes, and the
eous products pass off therefrom into the chamber over the incandes-
t fuel, and being detained in said chamber immediately in conta-
h the fire, are thoroughly combined with the oxygen of the air a-
amed so that no smoke passes away, only the gaseous products of
fect combustion. The coal will fall, or may be pushed down from
e to time as the fire burns away, and the fresh coal added does not
l the stove or deaden the fire, but there is an uniform combustion
steady heat, free from the smoke and soot heretofore existing when
coal was used.

t will be seen that my present invention is an improvement on that
forth in my patent of May 18, 1858.

What I claim and desire to secure by letters-patent is—

irst. A reservoir or hopper contracted at its lower end to contain
supply fuel, in combination with a fire-pot separate from said reser-
r, and to which the coal is supplied at or near the centre, so that the
ducts of combustion pass away from the surface of the fire around
contracted base of the said hopper, substantially as specified.

econd. I claim a chamber or horizontal flue around the base of the
reservoir or hopper supplying coal, and over the surface of the
fire, to receive and detain the products of combustion in contact
with the fire-heat until perfectly consumed, as set forth.

hird. I claim a contracted outlet or opening from the said chamber
orizontal flue, formed as aforesaid, to prevent a too rapid escape of
products of combustion, as specified.

ourth. I claim the surrounding case (*b*) in combination with the said
per, fire-pot, and chamber above the fire, for receiving the products
ombustion from the said chamber and radiating heat, substantially
et forth.

ifth. I claim, in combination with a hopper over the fire, a circulating
rent of air surrounding such hopper, to aid in cooling the fuel in said
per, substantially as specified.

ixth. I claim the supply-door *f*, and register *i*, in combination with
hopper *e*, and draft-space *g*, as set forth.

eventh. I claim a circulating current of air, passing through the hol-
lower end of the supply-hopper and entering the combustion-
mber over the fire, for promoting combustion and keeping the hopper
injury by heat, as set forth.

witness whereof I have hereunto set my signature this twenty
nd day of April, A. D. 1863.

J. C. HENDERSON.

Witnesses:
LEMUEL W. SERRELL.
CHARLES H. SMITH.

(The drawings annexed to this exhibit are the same as those annexed to Exhibit 11*b*, which see.)

(Here follows diagram marked 195, 196, 197, 198.)

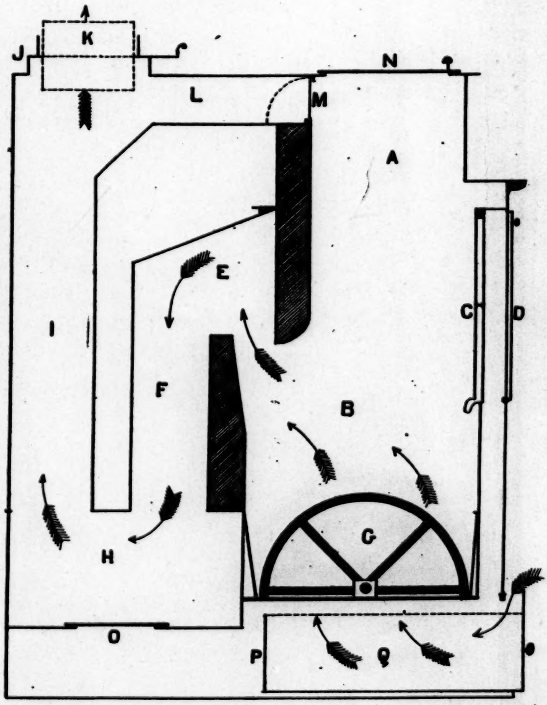
DEFENDANTS' EXHIBIT No. 16*b*.

The United States Patent-Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office.

SECTIONAL VIEW OF DEFENDANTS' EXHIBIT No. 7.

THE NOTT "SARACENIC GRATE."



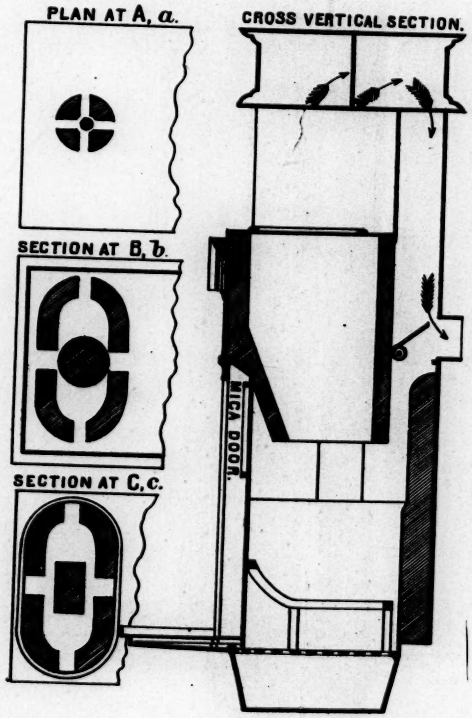
A, *Coal Supply Reservoir.* B, *Fire Pot.* C, *Grate.* C, *Bars to protect the Mica Door.* D, *Mica Door.* E, *Flame Expansion Chamber.* F, *Revertible Flue.* H, *Horizontal Chamber.* I, *Upward Draft Flue.* J, *Neck for Smoke Pipe.* K, *Damper.* L, *Direct Draft Flue.* M, *Damper.* N, *Cover of Reservoir.* O, *Opening for Cleaning Flues, with Sliding Cover.* P, *Ash Pit.* Q, *Ash Drawer.*

No 332. - Hailes -vs.- Van Wormer.

Page 195.

DEFENDANTS' EXHIBIT No. 18b.

DRAWINGS OF THE J.L. MOTT STOVE, EXHIBIT 8.



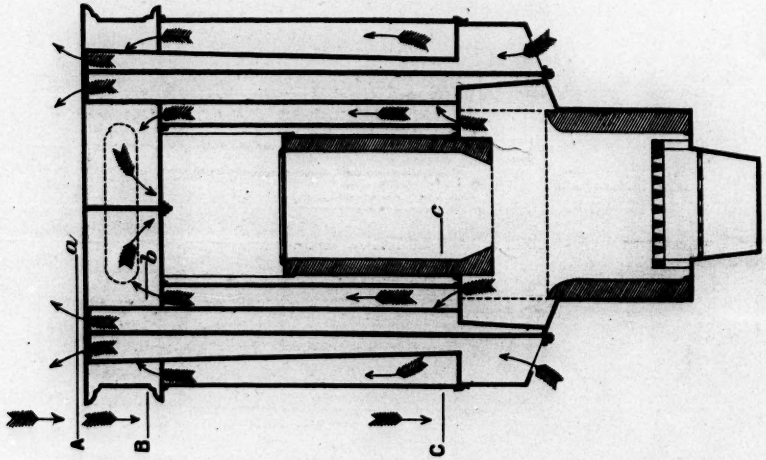
No. 332 - Hailes - vs. - Van Wormer.
Page 196.

No. 332. Hailes vs. Van Wormer.

Page 197.

111

LONGITUDINAL VERTICAL SECTION.



No. 332.- Hailes vs. Van Wormer.
Page 198.

DFFENDANTS' EXHIBIT. No. 19b.

In testimony whereof I, J. H. Hodges, acting commissioner of pa
ents, have caused the seal of the Patent-Office to be hereunto affixe
this thirtieth day of September, in the year of our Lord one thousa
eight hundred and sixty-eight, and of the Independence of the Unit
States the ninety-third.

[SEAL.] J. H. HODGES.

PETITION.

To the Commissioners of Patents:

The petition of John G. Treadwell and W'm Hailes, of the city and county of Albany, and State of N. Y., respectfully represents:

That your petitioners have invented a new and useful improvement in base-burning stoves, which they verily believe has not been known or used prior to the invention thereof by your petitioner. They therefore pray that letters-patent of the United States may be granted to them therefor, vesting in them and their legal representatives the exclusive right of the same, upon the terms and conditions expressed in the act of Congress in that case made and provided, they having paid thirty dollars into the Treasury, and compiled with the other conditions of said act.

They further pray that you will recognize C. M. Alexander as his attorney and agent to alter and amend the specifications, and to withdraw his application if necessary; to receive the patent for him
200 when granted, and to do all he could do if he were personally present and acting in the premises to sign drawings to them.

JNO. G. TREADWELL.
W'M HAILES.

OATH.

STATE OF NEW YORK, *County of Albany, ss:*

On this 28th day of February, 1861, before me, a justice of the peace, personally appeared the within-named John G. Treadwell and William Hailes, and made solemn oath that they verily believe themselves to be the original and first inventor of the mode herein described for improvements in base-burning stoves, and that they do not know or believe the same was ever known or used, and that they are citizens of the United States.

J. J. GALLUP,
Justice of the Peace.

SPECIFICATION.

To all whom it may concern:

Be it known that we, John G. Treadwell and William Hailes, of Albany, in the county of Albany and State of N. Y., have invented certain new and useful improvements in base-burning stoves, and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

In the annexed drawings, making a part of this specification, Figs. 1 and 2 represent vertical sections of the stove.

In these figures, A represents the external casing of the stove, which is made in any ornamental form, its lower portion being perforated as represented in Fig. 1, so that air can pass it and the cylinder within.

In testimony whereof I, J. H. Hodges, acting commissioner of pa
ents, have caused the seal of the Patent-Office to be hereunto affixe
this thirtieth day of September, in the year of our Lord one thousa
eight hundred and sixty-eight, and of the Independence of the Unit
States the ninety-third.

[SEAL.] J. H. HODGES.

PETITION.

To the Commissioners of Patents:

The petition of John G. Treadwell and W'm Hailes, of the city and county of Albany, and State of N. Y., respectfully represents:

That your petitioners have invented a new and useful improvement in base-burning stoves, which they verily believe has not been known or used prior to the invention thereof by your petitioner. They therefore pray that letters-patent of the United States may be granted to them therefor, vesting in them and their legal representatives the exclusive right of the same, upon the terms and conditions expressed in the act of Congress in that case made and provided, they having paid thirty dollars into the Treasury, and compiled with the other conditions of said act.

They further pray that you will recognize C. M. Alexander as his attorney and agent to alter and amend the specifications, and to withdraw his application if necessary; to receive the patent for him
200 when granted, and to do all he could do if he were personally present and acting in the premises to sign drawings to them.

JNO. G. TREADWELL.
W'M HAILES.

OATH.

STATE OF NEW YORK, *County of Albany, ss:*

On this 28th day of February, 1861, before me, a justice of the peace, personally appeared the within-named John G. Treadwell and William Hailes, and made solemn oath that they verily believe themselves to be the original and first inventor of the mode herein described for improvements in base-burning stoves, and that they do not know or believe the same was ever known or used, and that they are citizens of the United States.

J. J. GALLUP,
Justice of the Peace.

SPECIFICATION.

To all whom it may concern:

Be it known that we, John G. Treadwell and William Hailes, of Albany, in the county of Albany and State of N. Y., have invented certain new and useful improvements in base-burning stoves, and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

In the annexed drawings, making a part of this specification, Figs. 1 and 2 represent vertical sections of the stove.

In these figures, A represents the external casing of the stove, which is made in any ornamental form, its lower portion being perforated as represented in Fig. 1, so that air can pass it and the cylinder within.

B represents the fire-pot, and C the supply-cylinder immediately over it. The lower end of the supply-cylinder is provided with an annular contracting ring or diaphragm, *c*.

201 The object of this ring is to support the body of the coal in the supply-cylinder and prevent its forcing down to' much into the combustion-chamber, or fire-pot B. The coal is allowed to drop through this ring as it is needed in the fire-pot, through the converging sides of the ring evidently support the body of the coal.

H represents the inverted frustum of a cone secured between the supply-chamber and fire-pot, and also between the metallic ring *d*, and the ring or diaphragm *c*. This frustum is made of brick, black-lead, soap-stone, or any other suitable non-conducting substance. The metallic ring *d* is provided with a flange, through which it is bolted or secured to the supply-cylinder, and answers the purpose of holding and sustaining the frustum in proper position.

D D represents two descending flues, which receive the products of combustion from between the supply-cylinder and fire-chamber, as shown in Fig. 1, and convey them down into the hollow bottom of the stove or bottom flue, from whence they are carried up the flue E to the smoke-pipe.

The advantages of these flues D are very great in this class of stoves, for it is very essential that the smoke, gases, etc., should have some place of exit without being compelled to descend through the fire.

J J represents the combustion-chamber, which is protected from the coal in the supply-cylinder by means of the ring *c* and the frustum H, and being thus protected it is evident that continuous combustion is promoted around the entire top of the fire-pot. At the top of the supply-cylinder, and between it and the outer casing, is a chamber, F, for receiving the gas which is formed in and which escapes from the chamber C. The gas thus escaping passes into the smoke-pipe through pipe G; *a* and *e* represent two covers, one on top of the stove, the other on top of the supply-cylinder.

To the cover *a* is secured a rod *n* which passes through the cover *e*, and through the cap-piece *m*, which rests upon cover *e*. It will be seen that the cap-piece is not level on its bottom, and that when its lowest edge touches the top *e* it pushes the rod against the opposite side of the opening in the top through which it passes, and thus holds it.

202 The rod *n* may be raised or lowered at pleasure, and it will remain where it is stopped. When it is wished to move the rod, the cap-piece *m* is raised so as to have the opening through it in line with the opening in the top *e;* the rod will then move freely and easily The top *e* is pivoted to the top, and slides out of the way when it is desired to fill the stove with coal.

Having thus fully described our invention, what we claim as new, and desire to secure by letters-patent is—

1st. The formation of a circular or continuous combustion-chamber with one or more descending or ascending flues or outlets between the fire-pot and supply-chamber, as and for the purpose set forth.

Erase and insert A, filed April 6, '61 and B, filed April 11, '61.

2d. The contracting circular ring or diaphragm *c*, on the lower portion of the supply chamber, for the purpose set forth.

3d. The employment of the metallic ring *d*, and the inverted frustum of a cone H, formed of brick, black-lead, soap-stone, or other non-conducting substance, on the bottom of the supply-chamber, as and for the purpose described.

Erase and insert A, filed April 2, '61.

4. (3.) The employment of the covers *a*, *e*, the cap-piece *m*, and the rod *n*, constructed, arranged, and used as and for the purpose specified.

JNO. G. TREADWELL.
W'M HAILES.

Witnesses:
W'M STEVENS,
W'M MCROBERTS, JR.

(Indorsed:) Filed March 2, '61. J. F. G.

U. S. PATENT-OFFICE,
March 29th, 1861.

GENTLEMEN: Your application for letters-patent for improvement in stoves is not fully in condition to receive the action of the Office, the model not exhibiting the black-lead, etc., frustum of a cone, which
203 is one of the subjects of the third claim. Those subjects, if claimed specially, should also be covered by distinct claims. The flues which are an element of the first claim, are also not found in the model. The model should, of course, exhibit all that is claimed.

JNO. G. TREADWELL & W. HAILES,
(Care C. M. Alexander,)
Washington City, D. C.

(Indorsed:) Treadwell & Hailes, letter March 29, '61.

WASHINGTON, *April* 2, '61.

To the Commiss'r of Patents.

SIR: I hereby amend the case of Treadwell & Hailes for imp't in stoves by striking out the words "of brick" and all after them in the 3rd claim; substituting in their stead as follows, "constructed and used as and for the purpose herein specified."

A insert.

Hoping this amendment, with new model, may be satisfactory, I remain,

Resp'ts,

C. M. ALEXANDER,
Att'y for T. & Hailes.

(Indorsed:) Treadwell & Hailes, Amendment A, April 2, '61, E. J. Cancelled.

U. S. PATENT-OFFICE,
April 3, 1861.

SIR: The subject-matter of the first claim presented by your application for patent for improvement in base-burning stoves is not found to possess any novelty. The substantial anticipation of the feature is seen in the patent of Jordan L. Mott, of Dec'r 7th, 1837, in the rejected application of James Easterly, withdrawn Dec'r 8th, '54, in that of H. G. Giles, rejected Feb'r. 11th, '60, and in the patents of Gilbert & Kingsbury of April 12th, '59, and Sept. 18th, '60, the latter an add'l improvement.

The anticipation of the second claim is seen in the rejected appli-
204 cation of D. G. Littlefield, withdrawn July 22d, 1853. The equivalent of the device, which is the subject of the 3d claim, is seen in the cases of Kingsbury, Easterly & Giles.

The specification and drawing are therefore herewith returned for such amendment as will avoid the objections.

JNO. G. TREADWELL & WILLIAM HAILES,
(Care C. M. Alexander,)
R. D. C. *Washington City, D. C.*

(Indorsed:) Treadwell & Hailes, Papers ret'd April 3, '61.

WASHINGTON, *April* 5, '61.

To the Commiss'r of Patents.

SIR: I amend the case of Treadwell & Hailes for imp't in stoves by striking out the 1st, 2nd, and 3d claims originally submitted, and substitute as follows in their stead:

Erased April 11, '61.

1st. The formation of a continuous or a circular combustion-chamber beneath the eaves of the inverted frustum of a cone, H, constructed as set forth and used with one or more descending flues, arranged as specified.

A insert.

2nd. The combination of the contracting circular ring or diaphragm *c*, the inverted frustum H, and the metallic ring *d*, when the same are used as and for the purpose set forth.

I also amend by changing the 4th to the 3d claim.

Hoping these amendments may clear the case of the references given for the 1st three claims I remain,

Resp't,

C. M. ALEXANDER,
Att'y for Treadwell & Hailes.

(Indorsed:) Treadwell & Hailes, Amendment A. Filed April 6, '61. E. S. "A."

U. S. PATENT-OFFICE,
April 8th, 1861.

SIR: The first claim presented by your application as amended,
205 for patent for improvement in stoves, covers a construction and arrangement of combustion-chamber which appears to be but formally different from the same feature in the references heretofore given in relation to the first claim as originally presented.

That claim is therefore not deemed admissible. The specification amendment, and drawing are herewith returned for your further consideration.

J. G. TREADWELL & W. HAILES,
(Care of C. M. Alexander,)
Washington City, D. C.
R. D. C.

(Indorsed:) Treadwell & Hailes; papers ret'd April 8, '61.

WASHINGTON, *April* 11, '61.

To the Commiss'r of Patents.

SIR: I herewith return the papers in the case of Treadwell & Hailes amend' as follows: Strike out 1st claim of am'd't of April 5, '61, and change the numeral of the 2nd claim to 1st.

I further amend by adding the following claim 2d claim:

B insert. 2d. In combination with the subject of the first claim, we claim a continuous or circular combustion-chamber between the fire-pot and supply-cylinder, arranged with two or more descending flues as and for the purpose specified.

Resp't.,

C. M. ALEXANDER,
Att'y for Treadwell & Hailes.

(Indorsed:) Treadwell & Hailes. Amendment B. Filed April 11, '61. E. S., "B."

Revision No. 1899.

UNITED STATES PATENT-OFFICE,
Washington, April 25th, 1861.

SIR: Having examined the application of J. G. Treadwell & W'm Hailes for improvement in stoves, I approve the action of the ex-
206 aminer having charge of the case, and recommend that a patent be allowed accordingly.
Respectfully submitted,

T. R. PEALE,
Revising Examiner.

Hon. D. P. HOLLOWAY,
Com'r of Patents.

U. S. PATENT-OFFICE,
April 25th, 1861.

The above report is approved and a patent ordered.

D. P. HOLLOWAY,
Commissioner.

(Indorsed:) No. 1899. Approved.

164.

No. 1253. Whole No. 32,257.

J. G. Treadwell & W'm Hailes,
of Albany,
County of ,
State of New York.

No. 1899.

BASE-BURNING STOVES.

Rec'd	March 2d, 1861.
Petition	" " "
Affidavit	" " "
Specification	" " "
2 drawings	" " "
Model	" " "
Cert. dep.	" " "
1 cash, $30	March 2d, 1861.

Examined, April 17, '61..... R. D. Clarke.
2 issue, Shugut..... April 26, '61.
4 patented..... May 7, 1861.

Recorded vol. 1, 28, page 201.
B—

C. M. ALEXANDER.

207 Letter, Ma. 29, '61.
Letter, specifi'n & 1 dr'g.
Ret'd April 3d, 1861.
Letter, specifi'n am't, & 1 dr'g.
Ret'd April 8th, 1861.

(Indorsed:) Improvement in stoves. Revised and approved April 25, '61.

DEFENDANTS' EXHIBIT NO. 15*b*.

The United States Patent-Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this Office of the letters-patent granted J. G. Treadwell and William Hailes, 7th May, 1861, No. 1253.

In testimony whereof I, S. H. Hodges, Acting Commissioner of Patents, have caused the seal of the Patent-Office to be hereunto affixed, this thirteenth day of September, in the year of our Lord one thousand eight hundred and sixty-eight, and of the Independence of the United States the ninety-third.

[SEAL.] S. H. HODGES.

No. 1253. Whole No. 32,257.

The United States of America to all to whom to these letters-patent shall come:

Whereas J. G. Treadwell and William Hailes, of Albany, New York have alleged that they have invented a new and useful improvement in stoves which they state has not been known or used before their application; have made oath that they are citizens of the United States; that they do verily believe that they are the original and first
208 inventors or discoverers of the said improvement, and that the same hath not, to the best of their knowledge and belief, been previously known or used; have paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioners of Patents signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are, therefore, to grant, according to law, to the said J. G. Treadwell and William Hailes, their heirs, administrators, or assigns, for the term of seventeen years from the seventh day of May, one thousand eight hundred and sixty-one, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said J. G. Treadwell and William Hailes in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent-Office has been hereunto affixed.

Given under my hand, at the city of Washington, this seventh day of May, in the year of our Lord one thousand eight hundred and *and* sixty-one, and of the Independence of the United States of America the eighty-fifth.

CALEB B. SMITH,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent-Office.
[L. S.]
D. P. HOLLOWAY,
Commissioner of Patents.

The schedule referred to in these lett[illegible] atent, and making part of the same.

To all whom it may concern:

Be it known that we, John G. Treadwell and William Hailes, of Albany, in the county of Albany and State of New York, have in-
209 vented certain new and useful improvements in base-burning stoves, and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon:

In the annexed drawings, making a part of this specification, Figs. 1 and 2 represent vertical sections of the stove.

In these figures, A represents the external casing of the stove, which is made in any ornamental form, its lower portion being perforated as represented in Fig. 1, so that air can pass it, and the cylinder within.

B represents the fire-pot, and C the supply-cylinder immediately over it. The lower end of the supply-cylinder is provided with an annular contracting ring or diaphragm c.

The object of this ring is to support the body of the coal in the sup-cylinder, and prevent its forcing down too much into the combustion-nber or fire-pot B. The coal is allowed to drop through this ring as s needed in the fire-pot, though the converging sides of the ring evi-ently support the body of the coal.

H represents the inverted frustum of a cone secured between the pply-chamber and fire-pot, and also between the metallic ring *d* and ring or diaphragm *c*. This frustum is made of brick, black lead, soap-stone, or any other suitable non-conducting substance. The metallic ring *d* is provided with a flange, through which it is bolted or secured to the supply-cylinder, and answers the purpose of holding and sustaining the frustum in proper position.

D D represents two descending flues which receive the products of combustion from between the supply-cylinder and fire-chamber, as shown in Fig. 1, and convey them down into the hollow bottom of the stove or bottom flue, from whence they are carried up the flue E to the smoke-pipe.

The advantages of these flues D are very great in this class of stoves, for it is very essential that the smoke, gases, etc., should have some place of exit, without being compelled to descend through the fire.

J J represents the combustion-chamber, which is protected from
210 the coal in the supply-cylinder by means of the ring *c* and the frustum H, and being thus protected, it is evident that a continuous combustion is promoted around the entire top of the fire-pot. At the

top of the supply-cylinder and between it and the outer casing is a chamber F, for receiving the gas which is formed in and which escapes from the chamber C. The gas thus escaping passes into the smoke-pipe through pipe G. *a* and *e* represent two covers, one on top of the stove, the other on top of the supply-cylinder. To the cover *a* is secured a rod *n*, which passes through the cover *e*, and through the cap-piece *m*, which rests upon cover *e*. It will be seen that the cap-piece is not level on its bottom, and that when its lowest edge touches the top *e* it pushes the rod against the opposite side of the opening in the top through which it passes, and thus holds it.

The rod *n* may be raised or lowered at pleasure, and it will always remain where it is stopped. When it is wished to move the rod the cap-piece *m* is raised, so as to have the opening through it in line with the opening in the top *e*, the rod will then move freely and easily. The top *e* is pivoted to the top, and slides out of the way when it is desired to fill the stove with coal.

Having thus fully described our invention, what we claim as new and desire to secure by letters-patent is—

1st. The combination of the contracting circular ring or diaphragm *c*, the inverted frustum H, and the metallic ring *d*, when the same are used as and for the purpose set forth.

2d. In combination with the subject of the 1st claim, we claim a continuous or circular combustion-chamber between the fire-pot and supply-cylinder, arranged with two or more descending flues, as and for the purpose specified.

3d. The employment of the covers *a*, *e*, the cap-piece *m*, and the rod *n*, constructed, arranged, and used as and for the purpose specified.

JNO. G. TREADWELL.
W'M HAILES.

Witnesses:
W'M STEVENS.
W'M MCROBERTS, Jr.

Ex'd—A. T.

(Here follows diagram, marked page 211.)

212 DEFENDANT'S EXHIBIT, NO. 17*b*.

The U. States Patent-Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office of the file and contents in the matter of the re-issued letters-patent granted Treadwell and Hailes, dated February 3, 1863, No. 1397. "Stoves."

In testimony whereof I, J. H. Hodges, acting Commissioner of Patents, have caused the seal of the Patent-Office to be hereunto affixed, this thirtieth day of September, in the year of our Lord one thousand eight hundred and sixty-eight, and of the Independence of the United States the ninety-third.

[SEAL.]

J. H. HODGES,
Acting Commissioner.

30 cash, 2 dr'gs., old pat.

To the Commissioner of Patents:

The petition of John G. Treadwell and William Hailes, of Albany, in the State of New York, respectfully represents:

JOHN G. TREADWELL & W. HAILES,

Improvement in Base Burning Stoves.

(Patented May. 7th. 1861, No. 1,253.)

Fig. 1.

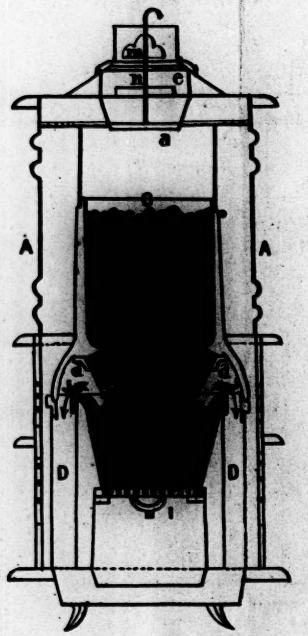
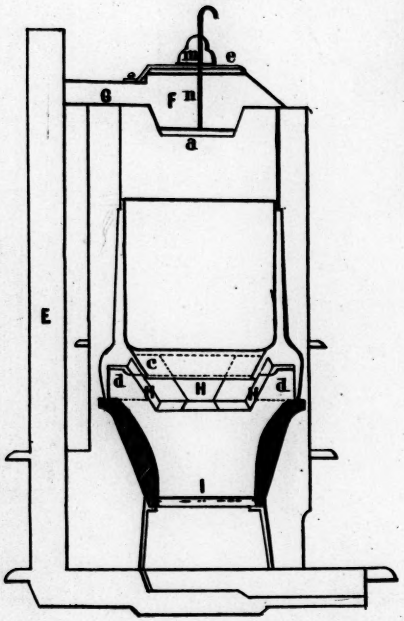


Fig. 2.



No. 332 Hailes vs. Van Wormer.
Page 211.

That they did obtain letters-patent of the United States for an improvement in base-burning stoves or furnaces, which letters-patent are dated the seventh day of May, eighteen hundred and sixty-one; that they now believe that the same are inoperative and invalid, by reason of a defective specification, which defect has arisen from inadvertence and mistake. They therefore pray that they may be allowed to surrender the same, and request that new letters-patent may issue to Ellen T. Treadwell and William Hailes, their assignees, for the same invention, for the residue of the period for which the original patent was granted, under the amended specification herewith presented, they having paid thirty dollars into the treasury of the United States, agreeably to the requirements of the act of Congress in that case made and provided.

$1 J. G. T., Dec. 30, 1862. $1.

213

We hereby appoint Mason, Fenwick and Laurence our attorneys.

JNO. G. TREADWELL.
WILLIAM HAILES.

COUNTY OF ALBANY, *State of New York:*

On this 30th day of December, 1862, before the subscriber, a justice of the peace in and for said county, personally appeared the above named John G. Treadwell, and William Hailes, and made solemn oath that he verily believes that, by reason of an insufficient or defective specification, their aforesaid patent is not fully valid and available; and that the said error has arisen from accident, or mistake, and without any fraudulent or deceptive intention, to the best of their knowledge or belief.

H. P. NUGENT,
Justice of the Peace.

To all whom it may concern:

Be it known that John G. Treadwell and William Hailes, of Albany, in the State of New York, are the inventors of certain new and useful improvements in base-burning stoves or furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings forming part of this specification in which—

Fig. 1 is a vertical section in a line at right angles to the smoke and draft flue.

Fig. 2 is a similar section directly through the smoke and draft-flue.

Fig. 3 is an inverted horizontal section through the base part of the stove in the line x x, of fig. 2.

Page 2.

Fig. 4 is a perspective view of the fire-pot and of the under side of lower portion of the coal reservoir, as the same appear when separated from each other.

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The same letters of reference in the several figures indicate corresponding parts.

The subject of base-burning or reservoir stoves and heaters has long engaged the attention of the public, and the success of this class of stoves is no longer a question of doubt, and the value thereof is an every-day experience of hundreds in different parts of the country, and the only question that now remains to be solved is, which is the best or most economical and beneficial mode of embodying the principle involved in such stoves and heaters.

Page 3.

Our experience in this class of stoves is, that the most beneficial effects are to be secured from an organization which does not pass the

up around and, so as to heat a surrounding jacket thereof

products of combustion ^ over the top of the coal supply reservoir ^ but heats a circulating, or ascending body of air by means of radiated heat from the fire-pot and at the same time heats the base of the stove by means of direct heat, circulating through descending flues which lead into the ash-pit, or around it and to the smoke and draft flue; also that the greatest economy, considering the increased benefits secured from supplying coal continuously out of a reservoir, is attained with an arrangement which holds the superincumbent body of coal in suspension—such arrangement being a reservoir with a contracted discharge extending slightly down into a flaring or enlarged

Page 4.

fire-pot, around or above the whole upper edge of which outside of the contracted discharge of the coal-supply reservoir, the flame is allowed to circulate and therefrom caused to descend and circulate around or under the base portion of the stove in its passage to the smoke and draft flue.

The effect of the first named plan is to husband the radiated heat and use it for the purpose of warming the upper part of the stove and the room in which it is situated, as well as for heating air for warming rooms above, if desirable; and at the same time to so confine the direct fire-heat and keep it in contact with the base portion of the stove a sufficient length of time as to insure the warning of the same to a comfortable degree. The effect of the second plan is to relieve

215 Page 5.

the incandescent coal from the weight of the body of superincumbent coal, and thus obviate a compression of the incandescent coal in the fire-pot and secure for the flame a free expansion in a lively and brilliant manner and thus enable it to act with great heating effect upon the lower portion of the stove in its passage to the smoke and draft flue.

With the view of organizing a stove or heater which operates on the base-burning or coal-supply reservoir principle and at the same time embraces the two plans of operation above referred to, we have devised the following plan of construction:

A is the base of our stove constructed with a chamber B, which extends around and beneath the top plate of the said base. In this chamber air may be admitted

Page 6.

through the front passage *a*. Upon the top plate of the base A is erected a support C, for a horizontal grate D, and a fire-pot E, as shown. The support forms a chamber below the grate, and out of the front of the support a portion of metal is removed as at *b*, so that air to the fire on the grate may have free access when the ordinary regulator or damper is open. In order to insure the passage of the air to the fire only from below the grate, a cut-off *c* extends out from the upper front part of the support C, and rests upon two lateral stops *d*, which extend out from the front of the support as shown. The top plate of the base, at points outside of the support C, is perforated with three apertures F, F^1, F^2, which communicate with the chamber B. The apertures F^1, F^2 have vertical pipes F^3, F^4, placed in or around them,

Page 7.

while the aperture F has the draft and smoke-pipe or flue F^5 placed in or around it as shown. The pipes F^3 F^4 extend up to the upper rim of the fire-pot E, and connect to perforated flanges or ears of said pot, so that a space *f* exists between the pipes and fire-pot, as shown. The outer portion of the top edge of the pipes F^3 F^4 protrudes above the flanges to a slight degree as indicated at *g g*.

216 The fire-pot flares at top, and contracts at its bottom; the flare and contraction are gradual.

The section of the metal of which the pot is made shows a gradual decrease in thickness from the centre of the depth of the pot in an up and downward direction as indicated at 1, 2, 3. This construction or form of the metal insures an equable heating of the pot at all parts, and a uniform expansion and contraction by the principle of conduction, the thickest and most intensely

Page 8.

heated portion imparting to the thinnest or less intensely heated portions a large amount of its heat, on the principle just mentioned.

Above the fire pot and vertical pipes, the coal-supply reservoir G is arranged. This reservoir is constructed with a flange *h*, at its base, said flange turning down at its outer edge so as to form a right angle or thereabouts, as shown at *i*. The rim *i*, of the flange, fits down upon the rim of the fire-pot and encloses the top opening of the fire-pot and of the vertical pipes within a continuous chamber *j*, as represented—the said chamber constituting an enlargement to the upper portion of the fire-pot as it were—and thus giving increased room for the expansion of the flame.

The diameter of the coal-reservoir is decreased below the point where body of supply coal is suspended by means of extension or ring flange K,

Page 9.

which is in form of an inverted frustum of a cone. This flanch also serves in connection with a detachable ring *l*, which also is in form of an inverted frustum of a cone, to form a frame or sash for the reception of fire-brick or other fire-proof material, as shown at *m*. The ring *l* has a horizontal flanch and bolts, by the same, to the under side of the flange *h*, of the coal-supply reservoir.

The fire-brick are shaped so as to form, when put together, an inverted frustum of a cone, and they, therefore, when clamped between the devices K *l*, cannot descend separately out of their places, nor can they do so unitedly, as the largest circumference of the conic frustum *m* cannot pass through the space between the lower ends of the devices K, *l*. It will be observed

217 Page 10.

that the fire-brick continues the contraction of the coal-supply reservoir and thus insure a gradual descent of the supply coal upon the central part of the bed of incandescent coal, and at the same time leave a large and open space outside of the conic frustum *m*, for the free burning and expanding of the gases or flame. This result is also furthered by the dishing form of the flange *h*; the same forming a large circulating flame-channel *j*, all round the upper edge of the fire-pot, as illustrated.

The reservoir G is continued up to a horizontal division-plate I, of the stove, by means of an extension, G^1, as shown. The division-plate I has a large coal-induction hole, *n*, in its centre, and several

Page 10½.

hot-air passages, *o*, *o*, near its circumference or outside of the circle of the coal-supply reservoir, as shown.

Around the central hole *n* there is constructed a small combined cylindric and conic hopper J, which is furnished with an adjustable valve *s*, and a removable cover-plate J^2, as hereinafter described. Through and from the rear of this hopper there extends a branch draft-flue, *r*, the same leading into the main draft-flue F^5, as shown. In order to open and close this flue, (*r*,) and also to open and close the induction-holes to the coal-supply reservoir, the taper-valve *s* is fitted to the lower part of the hopper J, and up from the center of the back of this valve a vertical rod, s^1, extends and passes through the removable

Page 11.

cover-plate J^2 of the hopper, and also through a weight, s^2, as shown.

The weight s^2 is not level on its bottom with the top surface of the cover-plate J^2, nor is the quantity of metal on one side of the rod as great as that on the other side.

The cover-plate, the valve, the rod, and the weight are all connected together, so that by taking hold of the rod the whole can be lifted together—that is, when the valve is raised first to its full stroke;
218 but the connection is also such that when the valve is required to be raised a less distance than its full stroke, the movement of the valve is independent of the cover-plate J^2; therefore the branch flue, *r*, can be opened and closed or the damper-valve adjusted without disturbing the

Page 12.

cover-plate, and whenever such an adjustment of the valve is made, the weight, by reason of its being unbalanced, will automatically bind upon the rod and hold it and the valve in suspension.

It is desirable to open the branch of the direct-draft flue when the fire is first started, and also before the cover-plate J^2 is removed—first, in order to obtain a powerful draft; and second, to pass off the pent-up gases in the coal reservoir, through the branch-flue instead of allowing them to puff out into the room at the time when fresh coal is being introduced.

The organization thus far described has but one shell, and, in order to make it a double

Page 13.

shell or wall stove, a casing, K, L, M, is placed around it from base to top. The part K of this casing encloses a portion of the fire-pot and of the vertical pipes and draft-flue. This part is finely perforated all around so as to admit air to the first wall to be heated as indicated at W.

The part L of the casing encloses the remainder of the vertical pipes and fire-pot, and also a small portion of the coal-supply reservoir, but not the main draft or smoke flue.

It is also finely perforated so as to admit cold air, as indicated at W^1. The part M of the casing encloses the remainder of the coal-supply reservoir, and extends up to and unites with a stationary top or finishing plate, W^2. This part of the casing is

Page 14.

not perforated, but the plate W^2 has perforations through it for the escape of the confined heated air, W^3, into the room or into pipes leading to rooms above, as indicated by arrows, W^4.

It will be seen that the air circulates all about the radiating surface, and thus protects the same from rapid destruction by the fire;
219 and while this is the case, the air is very thoroughly heated, and discharged in that state into the room where the stove is situated, or into other conductors.

We have given a minute description of one practical mode of embodying our invention, but in doing so we have not intended that we should be understood as confining ourselves to the details mentioned, as it is obvious that the invention

1, Page 15.

| 2 may be embodied in various | 3 ways. For instance, one or | 4 more than two vertical pipes (like F²) | 5 might be adopted. | Again | 6 the base of the stove might | 7 be made much deeper and the flame descend and circulate only around the grate-support C, instead of both around and under the ash-pit. In this change the draft-flue would not terminate so near the bottom-plate, but still would be in that part of the stove known as the base portion, nor would the vertical pipes extend down as low as shown. Again, the branch-pipe *r* might be located so as to lead out from the top of the fire-pot into the draft and smoke flue F⁵, and a common damper-valve be used in the flue. In this change the damper (*s*) and

Erase, see am'd't filed Jan'y 15, '63.

1, Page 16.

| 2 branch *r* would not be necessary | 3 and simply (a) cover-plate (J) fitted | 4 snugly would be used over | 5 the coal-supply reservoir.

Erase, see am'd't filed Jan'y 15, '63.

Again | 6 the contraction of the discharge | 17 end of the coal-supply reservoir, | 18 below the superincumbent body of | 19 coal, may be effected in various | 20 ways and still not depart from | 21 the principle involved in holding | 22 the mass of coal in a chamber | 23 or section of a chamber which | 24 is of greater diameter than | 25 the section or part through which | 26 the coal is fed to the fire.

| 27 For instance, a cylindric discharge | 28 of a given diameter | 29 connected with an upper extension | 30 of greater or gradually increasing | 31 diameter, above the discharge | 32 would embody the
220 principle | 33 involved in our reservoir. So also | 34 would two cylinders, one of a small diameter | 35 and the other of a large diameter, | 36 united by an inclined or horizontal | 37 shoulder,

Erase, see am'd't filed Jan'y 15, '63.

and finally, the outer | 38 casing and the fire-pot might | 39 be provided with a front illumi-

Page 17.

| 1 nation window, and the same | 2 isolated from | the air-space | 3 between the first and second shells, | 4 by a partition, in the same | 5 manner that the opening to | 6 the ash-pit is isolated from | 7 said air-space.

Erase, see am'd't filed Jan'y 15, '63.

It will be observed that we have a base-burning stove, with a coal-supply reservoir and a hot-air chamber, which is adapted for heating the room in which it is situated, or the same and rooms above, and still the organization has but two walls or shells; and that in connection with this we have an arrangement which effectually heats the lower portion of the stove or structure, and also very perfectly controls the feed of the coal to the fire.

Page 18.

What is claimed as new herein and as the invention of John G. Treadwell and William Hailes is,

| 1 1st. A base-burning | 2 coal-supply reservoir-stove or | 3 furnace, so constructed that | 4 the products of combustion do | 5 not pass up, around, and ^A above the supply | 6 reservoir, nor up through the | 7 grate, but ^A, insert Jan'y 15 '63. outside of the fire-pot down ^A toward | 8 the base of the stove and out through a main draft-flue which leads directly from a space or chamber about the lower part of the stove—all for the purpose set forth, and substantially as described.

2d. The contracting of the discharge-end of the coal-supply reservoir, the expanding of the fire-pot, and the extending of the flame-passage downward for united operation in a base-burning coal-supply reservoir-stove, or furnace, essentially as set forth.

Page 19.

| 1 3d. A fire-pot resting on a | 2 base, and imperforated on
221 its | 3 inner or outer circumference, | 4 or from its inner to its outer circum | 5 ference, and so constructed | 6 and applied with respect | 7 to a coal-supply reservoir that | 8 an inclosed ^A horizontal chamber for ^B insert Jan'y 15, 63. the | 9 free expansion and circulation | 10 of the flame and gases ^A is formed all | 11 around and outside of the | 12 contracted discharge, and ^ above | 13 ^v the upper edge of | 14 the fire-pot and the enlarged | 15 lower portion of the coal-supply | 16 reservoir, substantially as and | 17 for the purpose set forth.

Erased, see am'd'y, filed Jan'y 15, '63

4th. The descending passage or passages, in combination with the continuous flame-expansion and circulation passage, and a main draft-flue *e*, leading out of the base or lower part of the stove or furnace, substantially as set forth and for the purpose described.

5th. Constructing the fire-pot of

Page 20.

| 1 a base-burning coal-supply | 2 reservoir-stove or furnace, with | 3 an imperforated circumfer | 4 ence and in form of a trumpet | 5 mouth at its upper portion ^A | 6 substantially as described, | 7 and for the purpose set forth. 8

in combination with descending flame passages

[C Insert Jan'y 15, '63.

..... | 9 6th. Constructing the metal of | 10 the fire-pot with a gradually | 11 decreasing thickness from the | 12 centre of its depth, both up | 13 and downwards so that | 14 the heat by conduction | 15 shall be equal throughout | 16 and the contraction and | 17 expansion uniform, substan | 18 tially as described.

Erase Jan'y 15, '63.

7th. A detachable ring, in combination with a fixed ring-flanch of a coal-supply reservoir, for the purpose of confining the fire-brick or other fire-proof substance on the lower part of the reservoir.

8th. The combination of a perforated jacket or casing, a coal-supply

Page 21.

reservoir with a contracted discharge, a fire-pot with a flame-ex-
222 pansion chamber around and above its upper edge, and a

descending flue or flues, and a main draft-flue, substantially as and for the purpose described.

9th. The combination, in a base-burning coal-supply reservoir-stove, of a descending flue or flues, and a perforated casing, substantially as and for the purpose set forth.

10th. In a base-burning coal-supply reservoir-stove or furnace, we claim a branch-flue, opened and closed by a damper, above the base of the fire-pot, in combination with a descending passage or passages leading to the lower part of the stove, and with the main draft-flue leading out of the lower part of the stove, substantially as and for the purposes set forth.

11th. The weight constructed and applied in connection with the damper-valve, in the manner and for the purpose set forth.

12th. The combination of the perforated jacket or case, the reservoir for coal, the fire-pot, the descending flue or flues, the hollow space about the base of the stove, and the chimney-flue, whereby the base of the stove is heated by direct heat of the flame or gases, and the upper part of the stove by radiated heat acting upon the circulating air, substantially as described.

JNO. G. TREADWELL.
WILLIAM HAILES.

Witnesses:
W. W. CRAMWELL.
C. VAN ALLEN.

(Indorsed:) Rec'd and filed Jan. 6, '63.

[Mason, Fenwick & Laurence, American and Foreign Patent Attorneys, offices northeast corner of Seventh and F streets, opposite U. S. Patent-Office.]

WASHINGTON, D. C., *January 14th*, 1863.

To the Hon. D. P. HOLLOWAY:

SIR: In accordance with the requirements of the Office we hereby amend our application for re-issue on base-burning stoves, as follows:

1st. By cancelling all of page 15 after the word "adopted" in 5th ne thereof.

2d. By cancelling the first 4 lines of page 16, excepting the word "Again" in 4th line thereof.

3d. By cancelling the 37, 38, and 39th lines of page 16, excepting the word "shoulder."

4th. By cancelling the first seven lines of page 17.

5th. By inserting after the word "down," in the 7th line of the 1st aim, the words

Insert A "outside of the fire-pot" Insert

6th. By inserting the word B "horizontal" er the word "enclosed" in the 8th line of the 3d claim. Also by asing the words

Erase "and the enlarged lower portion of the coal-supply servoir" on the 14th, 15th, and 16th lines of same claim.

7th. By adding to the 5th claim these words,

C "in Insert combination with descending flame and passages," after the word "portion" in the 5th line of page 20.

Erased. 8th. By erasing the last two words of line 13, all of line 14, 15, 16, and the first two words of line 17, of page 20.

Very respectfully,

ELLEN T. TREADWELL.
WILLIAM HAILES.
By att'ys, MASON, FENWICK & LAURENCE.

(Indorsed:) John G. Treadwell and William Hailes. Amendment filed Jan'y 15, '63. N. C.

U. S. PATENT-OFFICE, *Jan.* 15, '63.

GENTS: The spec for in your application for the re-issue of your patent of May 7th, 1861, for an imp't in stoves is herewith returned for the language of amendment of several of the claims as indicated on their margin.

Your attention is also called to the new matter found on pages 15, 16, and 17. The changes and modifications suggested in the 224 passages objected to would require an additional model and additional drawings, and nothing is found in the original papers to justify the Office in regarding these modifications as parts of the original invention.

TREADWELL & HAILES,
(Care Mason & Co., Washington, D. C.) U. S. 3.

(Indorsed:) Official. Jan. 15, '63.

22 5 Re-issue. S F.

No. 1397 Van Sant.
John G. Treadwell and William Hailes, ass'ors, to William Hailes and Ellen T. Treadwell.
Of.....Albany,
County of "
State of New York.

Stoves.

Rec'd.....January 6th, 1863.
Petition,
Affidavit,
Specification,
2 Drawings,
Old Pat.,
Cert. dep.,
Cash $30.....January 6th, 1863.
Add'l fee cert.,
" " cash,
Examined.....January 17, 1863, vans'd.
2 Issue Hayes,.....January 20, 1863.
4 Patented,.....May 7. 1861. +

No. 332 Hailes vs. Van Wormer
Page 225

DRAWINGS ANNEXED TO

COMPLAINANTS' EXHIBIT B.

JOHN G. TREADWELL, AND ELLEN T. TREADWELL, AND WM. HAILES,
ASIGNORS TO WM. HAILES.

Improvement in Base Burning Stoves.

Reissued February 3d, 1863, No. 1,397).

Fig 1.

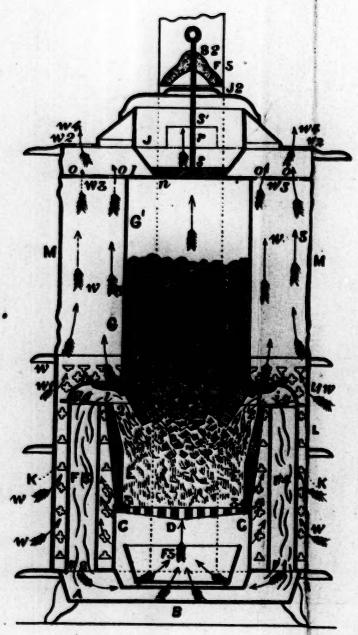
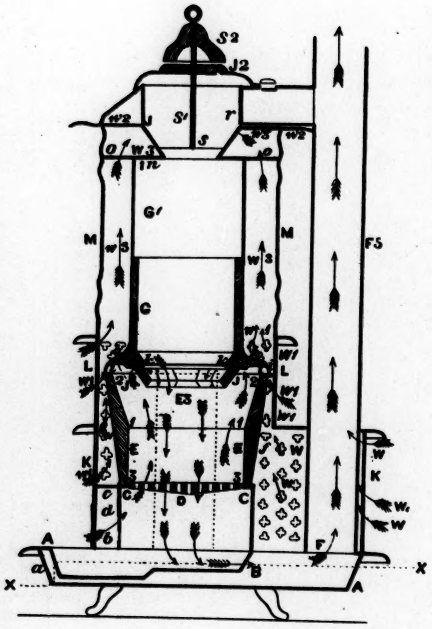
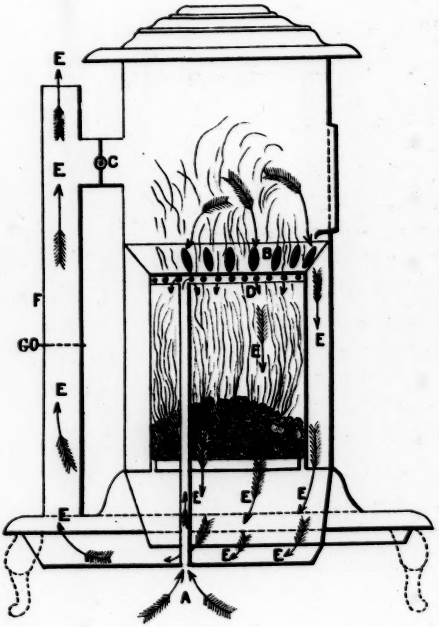


Fig 2.



SECTIONAL VIEW OF THE AMERICAN GAS BURNER.



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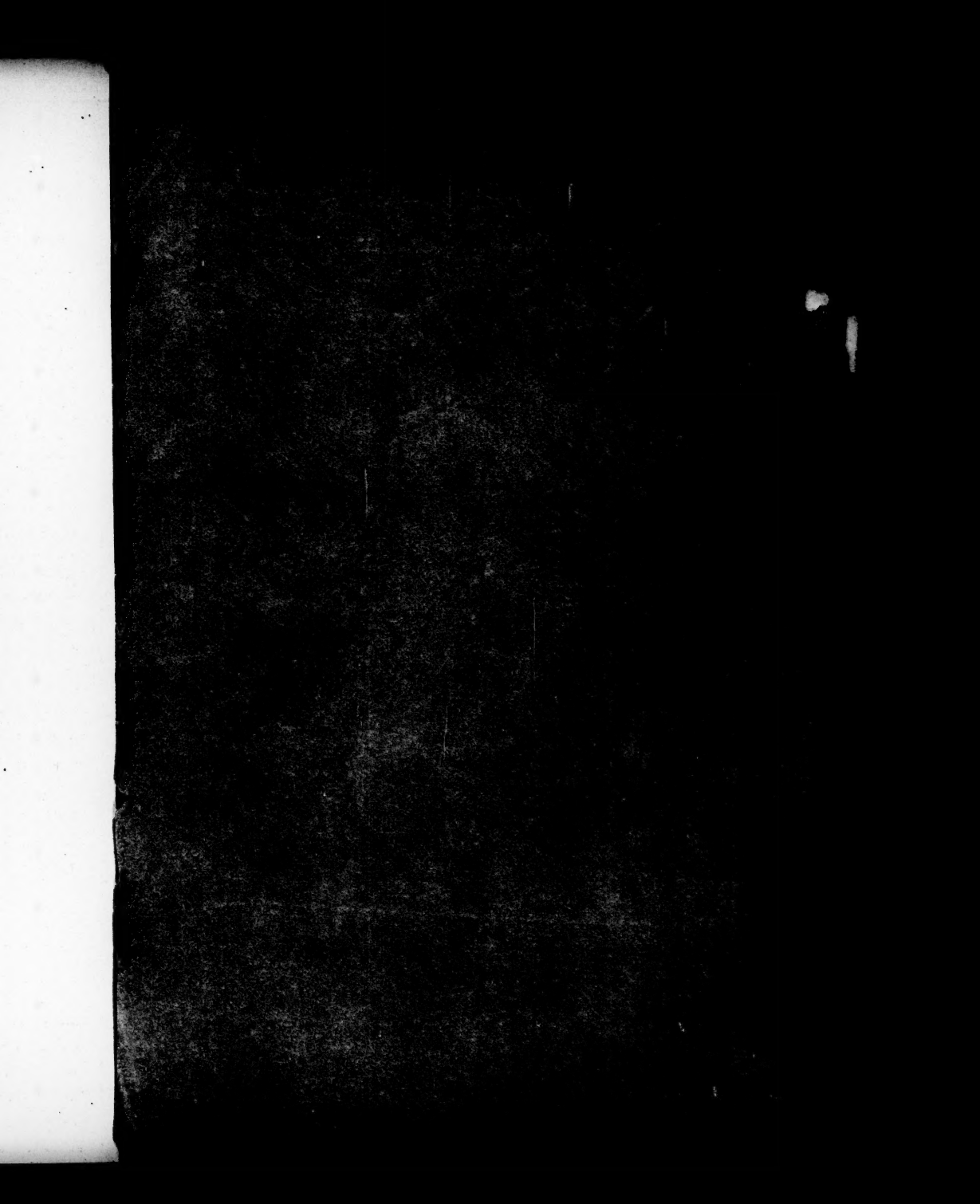
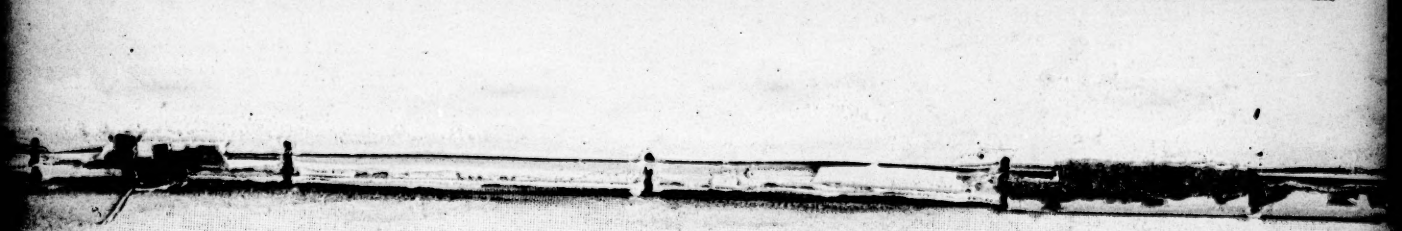
Page 230.





No. 332. - Hailes vs. Van Wormer.

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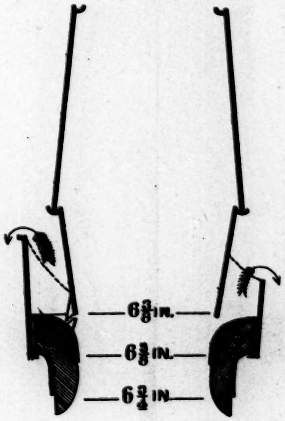
Fig. 4.

Fig. 5.

SECTIONAL VIEW OF THE FEEDER OR RESERVOIR IN THE STOVE,

DEFENDANTS' EXHIBIT Nº 11,

i. e, the Latest Modification of "The Brilliant."



DRAWINGS ANNEXED TO

COMPLAINANTS' EXHIBIT C.

John G. Treadwell and Wm. Hailes. Improved Base Burning Stoves.

(Patented August 11th, 1863, No. 39,535).

Fig. 1.

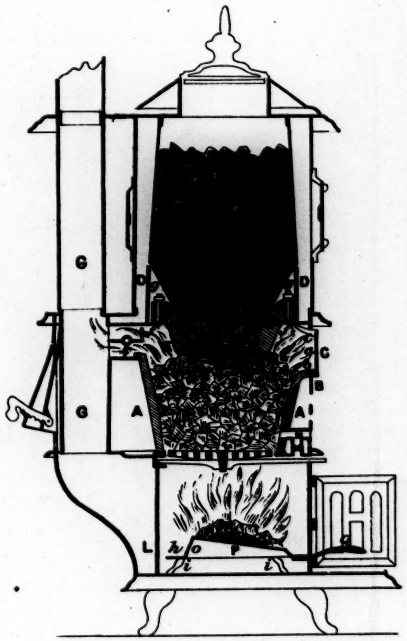


Fig. 2.

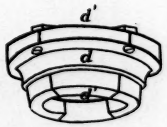
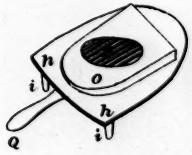


Fig. 3



Re-issued,.....Feb'y 3, 1863.

Recorded vol. No. 11, page 43.

Circular.

MASON, FENWICK & LAWRENCE,

S Present.

Spec^{n} ret^{d}.....Jan. 15, '63.

(Indorsed:) Imp't in stoves.

(Here follow diagrams marked pages 225, 226, 227, 228, 230, 231.)

232 DEFENDANTS' EXHIBIT NO. 13*b*.

The United States Patent-Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this Office of the letters-patent granted Van Wormer & McGarvey, dated 1st May, 1866, No. 54447.

In testimony whereof I, Elisha Foote, Commissioner of Patents, have caused the seal of the Patent-Office to be hereunto affixed this fourth day of October, in the year of our Lord one thousand eight hundred and sixty-eight, and of the Independence of the United States the ninety-third.

[SEAL.] ELISHA FOOTE.

No. 54447.

The United States of America to all to whom these letters-patent shall come:

Whereas Jasper Van Wormer and Michael McGarvey, of Albany, New York, have alleged that they have invented a new and useful improvement in base-burning stoves, which they state has not been known or used before their application; have made oath that they are citizens of the United States; that they do verily believe that they are the original and first inventors or discoverers of the said improvement, and that the same hath not, to the best of their knowledge and belief, been previously known or used; have paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

233 These are therefore to grant, according to law, to the said Van Wormer & McGarvey, their heirs, administrators, or assigns, for the term of seventeen years from the first day of May, one thousand eight hundred and sixty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Van Wormer & McGarvey, in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent-Office has been hereunto affixed.

Given under my hand at the city of Washington, this first day of May, in the year of our Lord one thousand eight hundred and sixty-six, and of the Independence of the United States of America the ninetieth.

W. T. OTTO,

Acting Secretary of the Interior.

Countersigned and sealed with the seal of the Patent-Office.

[L. S.] T. C. THEAKER,
Commissioner of Patents.

The schedule referred to in these letters-patent, and making a part of the same.

Be it known that we, Jasper Van Wormer and Michael McGarvey, of the city of Albany, State of New York, have invented certain new and useful improvements in the construction of magazine or self-feeding coal stoves, and we declare the following specification, with the drawings forming part thereof, to be a full and complete description of our invention:

Figure 1 represents a hall-stove in central vertical section, showing the interior construction and operation of the stove.

234 Figure 2, the stove in perspective, with the hither half of the outer shell removed, but the magazine or fire-pot shown entire.

Similar letters denote the same parts of the apparatus. A is the outer shell; B the fire-pot; C the ash-pit; E the downward draft-flue; F the base-flue; G the grate; H the nozzle for the smoke-pipe; J the door; K the magazine; W the opening at the top for the passage of coal to the magazine.

The first improvement regards the magazine or feeder for the coal intended to regulate the supply of fuel to the grate in larger or smaller quantities, and is effected by so arranging the magazine that it can be lowered or raised so as to bring its open bottom to or from the body of coal burning on the grate. This may be done by various devices, the method of doing it not being essential.

The arrangement we employ is thus: The magazine K is a cylinder of sheet-iron open at both ends, the lower end being slightly contracted as shown. L is a second cylinder of sheet-iron surrounding the magazine K, and just so much larger than it as to permit K to move freely within it. Cylinder L is secured to the shell A by braces, (two of them, M, being shown,) so as to support the weight of the magazine with its load of coal.

From the opposite sides of K project two pins P, intended for its support upon cylinder L. For the reception of these pins, there is in the upper part of L, extending downwards, grooves or channels N, cut vertically and horizontally in alternate strips, as shown in Fig. 1, so that when the pins P rest in the horizontal grooves, by turning the magazine slightly to the right or left hand, it can be raised or lowered through a vertical groove, and the pins placed within other horizontal grooves.

To provide for the supplying of coal to the magazine through the opening P, at the top of the stove, without allowing the escape of fumes from the smoke-flue around the magazine, this device is employed.

There extends downwards from W a cylinder P, open at top and bottom, of less diameter than K, and P passes down into K through an opening in its top-sheet R, which fits snugly around it, so that

235 the movement of the magazine upwards or downwards will uncover no opening at its top into the body of the stove.

The magazine itself might be carried through the top-plate of the stove, but that would be an unsightly arrangement. It will be seen that there may be variations in the proportions of this arrangement.

The cylinder P might be continued downwards a considerable distance, thus becoming the magazine, and the sliding part K be proportionally reduced so that only the lower section of the magazine would

Hailes

No. 332 *vs.* *Page 237.*

Van Wormer

FIG. 2.

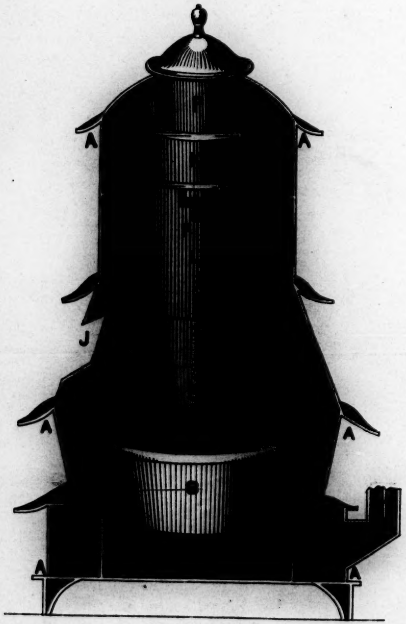
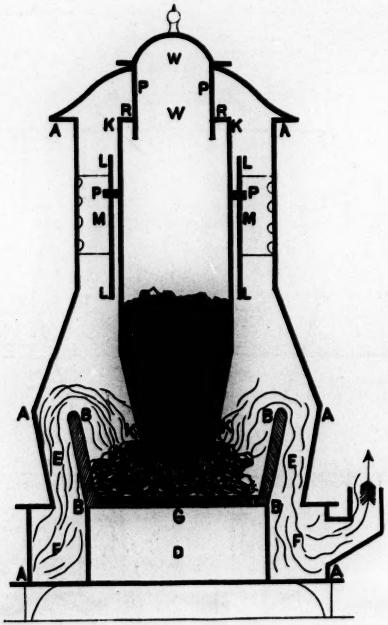


FIG. 1.



VAN WORMER & Mc GARVEY'S

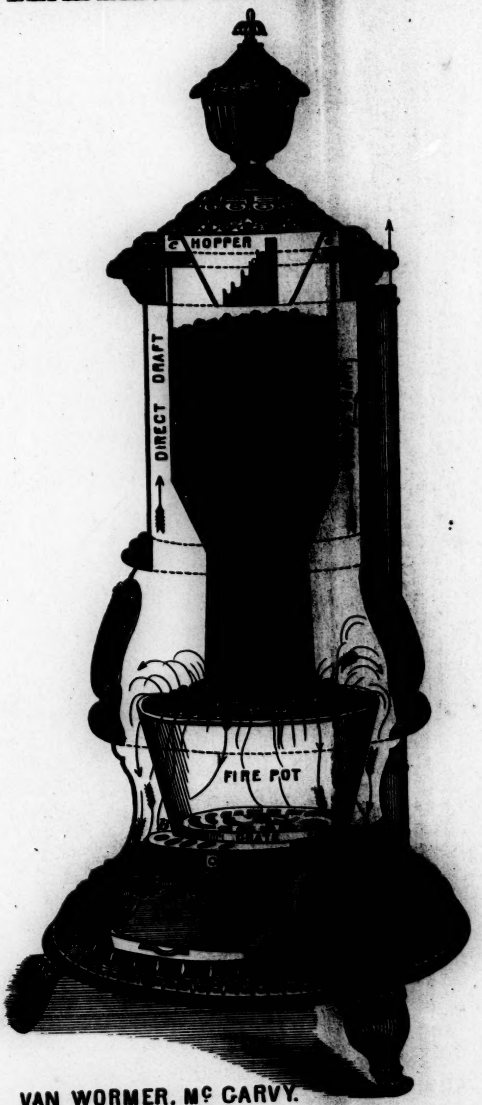
ADJUSTABLE MAGAZINE STOVE.

(Patented May 1st, 1860, No. 34,449).

DEFENDANTS' EXHIBIT No. 5.

No. 332. Hailes vs. Van Wormer.

Page 240.



VAN WORMER, Mc CARVY.
ALBANY, N.Y.

be movable; or if it be not deemed worth while to retain the radiating chamber between the magazine and the outer shell of the stove, the whole upper part of the stove might be used for a magazine, with a movable lower section or mouth-piece.

The second improvement is in the combination with the above-described self-feeding apparatus, of the arrangement of the fire-pot B, as shown, so that the flame and gases shall have an uninterrupted passage over the entire upper edge of the pot downwards into the flue E, being the entire space between the pot and the outer shell B of the stove, and thence down into a base-flue F, being the entire base-chamber not occupied by the ash-pit D, and thence out through the nozzle H.

The advantages of the above construction of stove are as follows:

1. The adjustable feeder affords the means of regulating the size of the fire to meet the changes of temperature in the weather, or any exigency requiring a varying amount of heat from the stove. It also permits the use of coals of various sizes, by regulating the quantity of the supply in proportion to the size of the coal, whereas a fixed feeder, being adjusted for the use of some one-sized coal, makes the employment of a larger or lesser size an uneconomical as well as an inconvenient matter.

2. The continuous flue arrangement, instead of that of separate flues at intervals around the stove as now used in self-feeding stoves, secures a more equable and perfect combustion of all the coal in the fire-pot and consequent uniform distribution of heat to the radiating surface
236 of the stove, for wherever separate flues are used the masses of coal, lying in the intervals between the flues and out of the range of the lines of draught from the grate to the flues, remain unburnt, occupying much room, without contributing to the heat of the stove.

3. The mode of attaching the feeder as shown in combination with the free downward draught of the continuous flue arrangement, not only prevents the escape of gas and smoke when the feeder is being supplied with coal, but produces a constant downward draught through the feeder and in the chamber around it, preventing any accumulation of gas in the chamber, which constantly occurs with the ordinary flue arrangement of self-feeding stoves, and, unless great caution be exercised in the process of supplying fuel, results in disastrous explosions upon the union of the atmospheric air with the gas.

What we claim and desire to secure by letters-patent is—

1. An adjustable feeder, whereby the supply of coal may be increased or diminished, by raising or lowering the mouth of the feeder, from or towards the grate of a stove, substantially as described and for the purpose set forth.

2. The combination of an open flue extending entirely around the fire-pot and the outer shell of the stove, with a magazine feeder as described, and for the purpose set forth.

JASPER VAN WORMER.
MICHAEL McGARVEY.

Witnesses:
RICH. VARICK DEWITT.
ROB'T HASTINGS.

(Here follow diagrams marked pages 237, 238, 239.)

241 At a special term of the circuit court of the United States of America for the northern district of New York, in the second circuit, held at the clerk's office in Utica on Thursday, the 3d day of

December, in the year of our Lord one thousand eight hundred and sixty-eight,

Present, the Honorable Nathan K. Hall, judge.

WILLIAM HAILES ET AL.
vs.
JASPER VAN WORMER ET AL. } In equity.

On filing stipulation in this cause signed by the solicitors of the respective parties, ordered that a rule or order be entered herein as of the 3d day of September, 1868, to the following effect, viz:

That the proofs and testimony on the part of the defendants herein may be taken before William H. Bishop, esquire, notary public, of the city of New York, at his office, No. 7 Warren street, in said city, upon five days' notice to the solicitor for complainants, and said William H. Bishop is hereby appointed special examiner for that purpose; and that the testimony so taken may be returned and filed with the clerk of this court, and when filed may be opened by him, and be used and read by either party on the hearing of this cause as proofs duly and regularly taken for such hearing, subject to all objections noted in the taking of such proofs. And it is also ordered that the time for taking proofs in this cause be, and the same is hereby, extended until the 15th day of October, 1868.

A copy, as entered.

Witness my hand and official seal at my office in Utica, this 3d day of December, A. D. 1868.

N. N. BOYCE, *Clerk.*

242 Circuit court of the United States, northern district of New York.

WILLIAM HAILES AND ELLEN T. TREADWELL
vs.
JASPER VAN WORMER ET AL. } In equity.

To JOEL TIFFANY, Esq., *Solicitor for Complainants.*

SIR: Please take notice that the defendants in the above-entitled action will proceed to take testimony to be used in evidence on the hearing thereof, before William H. Bishop, esq., at his office, No. 7 Warren street, in the city of New York, commencing on the 11th day of September, 1868, at 10 o'clock a. m., of that day, and to continue from time to time, until they shall have fully examined, as witnesses, Michael Bulger, Joseph C. Barnes, Jasper Van Wormer, J. J. Coyle, M. McGarvey, M. P. Dorsch, C. J. Shepard, W. Sanford, Samuel Pierce, and R. P. Thompson, at which time and place you can attend, and cross-examine said witnesses as you shall think proper.

Albany, September 5th, 1868.

Yours, etc.,

J. C. McCLURE,
Solicitor for Defendants.

Due service of a notice of which the foregoing is a copy is admitted. And it is hereby stipulated and agreed that the various exhibits which may introduced in evidence on the part of the defendants, may be

delivered by the examiner to the solicitor for said defendants, to be by him produced on the hearing of this cause.

Albany, September 5th, 1868.

JOEL TIFFANY,
Solicitor for Complainants.

243 Circuit court of the United States in & for the northern district of New York, in the second circuit.

WILLIAM HAILES AND JOHN G. TREADWELL, adm'r' of Ellen Treadwell, deceased,
vs.
JASPER VAN WORMER, MICHAEL MCGARVEY, Abram Mann, & Joseph C. Barnes.

Whereas a decree was pronounced, filed, and entered in this cause on the 21st day of June, 1870, dismissing the plaintiffs' bill of complaint herein, with costs; and whereas the said costs were tended by stipulation of the parties by their in favor of the defendants and against the complainants for the sum of two hundred and fifty dollars, and the decree thereupon was duly enrolled on the 27th day of September, 1870, in the clerk's office at Utica, in said district:

Now, therefore, the said complainants, considering themselves
244 ag'rieved thereby, do appeal from the said decree, and from the whole and every part thereof, to the Supreme Court of the United States.

WILLIAM HAILES AND
JOHN G. TREADWELL, *Adm'r.*

By their solicitor & counsel,

JOEL TIFFANY.

E. F. BULLARD, *Troy,*
Of Counsel.

(Indorsed:) In circuit court United States. William Hailes & John G. Treadwell, &c., vs. Jasper Van Wormer, Michael McGarvey, et al. Petition of appeal.

The within appeal allowed and bond approved and citation signed this 27th day of February, 1871.

N. K. HALL,
U. S. District Judge, northern dist. of New York.

Filed March 1, 1871.

245 THE UNITED STATES OF AMERICA, *ss:*

To Jasper Van Wormer, Michael McGarvey, Abram Mann, & Joseph C. Branes, greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States, to be holden at Washington, D. C., on the first Monday of December next, pursuant to an appeal filed in the clerk's office of the circuit court of the United States for the northern district of New York, wherein William Hailes and John G. Treadwell, adm'r', &c., are complainants and you are defendants, to show cause, if any there be, why the decree in said mentioned should not be cor-

rected, and speedy justice should not be done to the parties in that behalf.

Witness the Hon. Salmon P. Chase, Chief Justice of the Supreme Court of the United States of America, the 3d day of December, 1870.

[SEAL.] N. K. HALL,
U. S. Dist. Judge, northern district of New York.

CHARLES MASON, *Clerk.*

246

247

248 NORTHERN DISTRICT OF NEW YORK,
Rensselaer County, ss:

Joseph B. Wilkinson, j'r, being duly sworn, says that, previous to the first day of August last, & on the 20 day of March, 1871, he served the within citation upon Michael McGarvey, one of the persons therein named, to deponent personally known, by showing him said original, & at the same time leaving a copy thereof with him, at the city of Albany, N. Y.

JOS. B. WILKINSON, JR.

Sworn this 27 day of Nov., 1871, before me.

J. J. TILLINGHAST,
Notary Public, Troy, N. Y.

Serv'd on McGarvey & Bound, M'ch 20, 1871.

(Indorsed:) In Supreme Court U. S. Treadwell & Hailes vs. Van Wormer, McGarvey, et. Citation. E. F. Bullard, sol. for compl't, Troy, N. Y. Filed November 28, 1871.

249 Know all men by these presents that we, William Hailes & John G. Treadwell, adm'r', &c., of Albany, in the county of Albany, as principals, & Conrad Van Allen, of the same place, & Edward F. Bullard, of the city of Troy, N. Y., as sureties, are held and firmly bound unto Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes, of the same place, in the sum of two thousand five hundred dollars, to be paid them, their heirs, executors, administrators, or assigns, to which payment, well and truly to be made, we bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents. Sealed with our seals, and dated 13th day of Dec., A. D. 1870.

Whereas William Hailes and John G. Treadwell, admin., &c., have appealed or are about to appeal to the Supreme Court of the United States, from the decree of the circuit court of the United States for the northern district of New York, in a cause wherein the said William Hailes and John G. Treadwell were complainants, and the said Jasper Van Wormer, Michael McGarvey, Abram Mann, & Joseph C. Barns were defendants:

250 Now, therefore, the condition of this obligation is such that, if the above-named appellants shall prosecute their appeal to effect, and answer all damages and costs, if they fail to make good their appeal,

this obligation to be void; otherwise to be and remain in full force and effect.

JNO. G. TREADWELL, *Admin., &c.* [L. S.]
WILLIAM HAILES. [L. S.]
CONRAD VAN ALLEN. [L. S.]
E. T. BULLARD. [L. S.]

NORTHERN DISTRICT OF NEW YORK,
County of Albany, ss:

On this 13th day of December, A. D. 1870, before me appeared Conrad Van Allen, John G. Treadwell & William Hailes, and on the 23d day of February, 1871, also, Edward F. Bullard appeared, to me known to be the individuals described in and who executed the foregoing bond, and severally acknowledged that they each executed the same.

[L. S.] EDWARD WADE,
Notary Public in and for the State of New York, residing at Albany, N. Y.

251 NORTHERN DISTRICT OF NEW YORK,
County of Albany, ss:

Conrad Van Allen, being severally and duly sworn, depose and say, and each for himself says, that he resides in the city of Albany, and that he is a freeholder and resident of said district, and is worth the sum of twenty-five hundred dollars over and above all debts and liabilities he owes or has incurred, and exclusive of property exempt from levy and sale on execution.

C. VAN ALLEN.

By the above-named Conrad Van Allen.
Sworn and subscribed before me this 13th day of December, A. D. 1871.

[L. S.] EDWARD WADE,
Notary Public, Albany, N. Y.

NORTHERN DISTRICT OF NEW YORK,
City & County of Albany, N. Y., ss:

Edward F. Bullard, being duly sworn, deposes and says, that he resides in the city of Troy, Rensselaer County, New York, and that
252 he is a freeholder and resident of said district, and is worth the sum of twenty-five hundred dollars, over and above all debts and liabilities he owes or has incurred, and exclusive of property exempt from levy and sale on execution.

E. F. BULLARD.

Sworn to and subscribed before me this 23rd day of February, 1871.

[L. S.] EDWARD WADE,
Notary Public, Albany, N. Y.

(Endorsed:) Treadwell & Haile, vs. Van Wormer & McGarvey, &c. Bond.
I approved of the within bond and of the sureties therein.
Feb'y 28th, 1871.

N. K. HALL,
U. S. Dist. Judge, N. Dist. of N. Y.

Filed March 1, 1871.

253 United States circuit court, northern district of New York, ss:

I, Charles Mason, clerk of the circuit court of the United States of America for the northern district of New York, do hereby certify that I have compared the writings annexed to this certificate, and they are true copies of their respective originals, and are correct transcripts therefrom, now on file and remaining of record in my office, being a full and complete copy of the record and proceedings in the suit of William Hailes and Ellen T. Treadwell vs. Jasper Van Wormer & others.

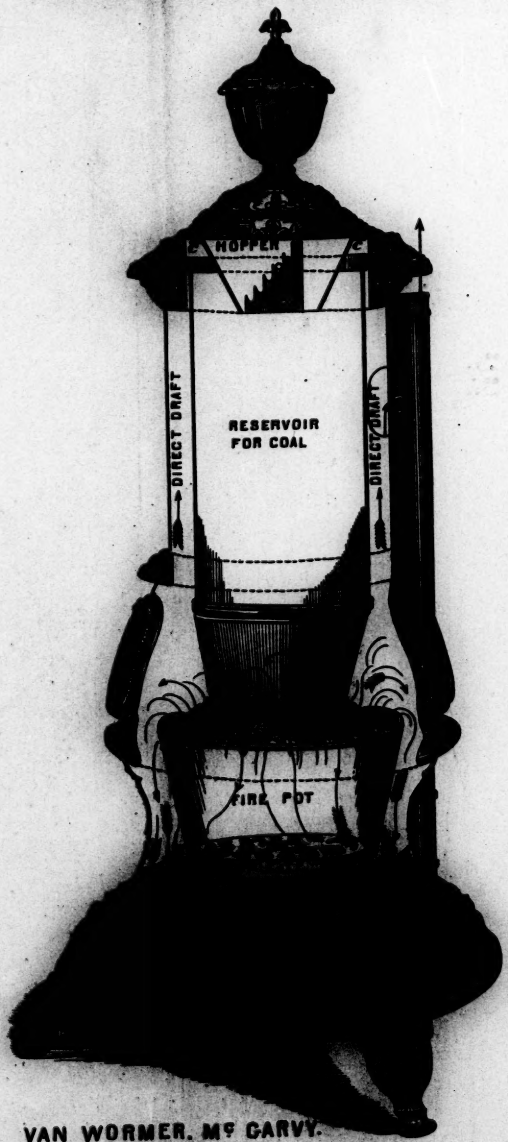
In testimony whereof I have hereunto set my hand and duly affixed the seal of the said court, at the city of Utica, in said district, this 29th day of November, A. D. 1871.

[SEAL.] CHARLES MASON, *Clerk.*

(Indorsement on cover:) No. 332. William Hailes & John G. Treadwell, adm'r, of Ellen Treadwell, dec'd, appellants, vs. Jasper Van Wormer, Michael McGarvey, Abram Mann, and Joseph C. Barnes. N. New York. C. C. W. S. Filed 18th January, 1872.

O

DEFENDANTS' EXHIBIT No. 4.



VAN WORMER, Mc CARVY.
ALBANY, N.Y.

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Page 239

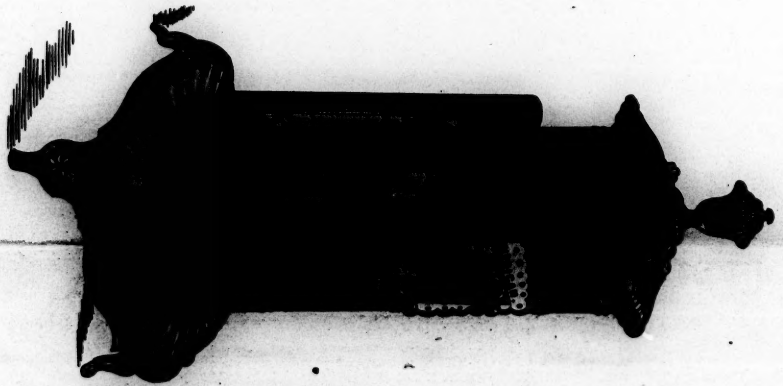
DEFENDANTS' EXHIBIT No. 4.

Nº 332. *Hailes vs. Van Wormer* *Page 238.*

VAN WORMER & McGARVEY
ALBANY, N.Y.

No. 332 Hailes vs. Van Wormer.

Page 231.



OUTSIDE VIEW OF THE AMERICAN GAS BULNER.

145.

opening in the outer casing or jacket B of the stove, and close it with mica or other transparent material, C, as shown. We may find it more practical to form a short ledge on the upper edge of the fire-pot, as at b, and cast the enlargement c on the part D, which forms the expansion-flame-passage E, as shown. In any case, the illumination-window must be constructed so as to confine the flame and gases at this point within the flame-chamber E. Our second improvement is carried into practice by casting in like manner an enlargement of proper form to make a branch-flue, F, on the upper edge of the fire-pot, or on the lower edge of the part D, as represented. This branch-flue we run into the smoke-pipe or draft-flue G, and in order to open and close it at will,
57 we have arranged within it a damper or valve, I, which has its rod, by which it is turned, extended to the outside of the casing of the stove. By opening the damper, a direct draft is obtained, and the fire can be kindled very speedily, and the draft does not have to pass up through the body of coal in the reservoir, as in our other patented stove. When the damper is closed the highly-ignited gases pass down the descending flues J J, as in our former patent. We will here state that we have slightly modified the base of our stove by increasing the depth of the ash-pit K, and dispensing with a chamber or space underneath the ash-pit. This space or chamber L, in which the heated products of combustion circulate to heat the base of the stove, and pass to the draft or smoke flue, being only around the ash-pit.

Our third improvement we carry into practice by casting two rings of circular form, and of segment or angular form in their cross-section, as indicated at d d. Between these rings we insert fire-brick sections, which are segments of a hollow frustum of a cone, and in their transverse section are in form adapted to the form of the rings, as shown. These rings and bricks are firmly riveted together, as illustrated in Fig. 2, and the conic throat thus formed is supported free, as to expansion and contraction, on a ledge, f, formed on the part D, as represented. When the throat is placed on the ring we insert within the coal-supply reservoir, just above it, an inverted frustum of a hollow cone, as shown at g, so as to ease the descent of the coal and prevent a lodgment in the corner formed by the portable throat and the reservoir. We do not confine ourselves to forms of throat, as our invention consists in a portable throat, constructed of two rings and fire-proof material, so that it may be suspended free as to bolt-fastenings, and have every chance to expand and contract independent of the stove-castings.

Our fourth improvement is carried into practice by forming a branch or vertical extension, M, of tubular form, on the under side of the ordinary poker-hole N, and have the said extension communicate with the poke-hole N, and therefrom lead down through an extension of the base of the fire pot or grate into the ash-pit, as represented, so that if a red-hot coal should be drawn out by the poker it will, in its passage, fall down through the branch M into the ash-pit.

Our fifth improvement is carried into practice by casting a hol-
58 low or box grate-frame O, with its upper surface inclined. Within the centre of this frame we set a grate, P. To the front of the frame we attach a handle, Q. From the edges of the frame a flange, h, extends, and to the under side of this flange legs, i i, are fastened. This portable, auxiliary grate is set in the place occupied by the ash-pan when it is desired to start a fire in the fire-pot; and when thus placed the air has a free circulation under it and through the grate, as the bottom of the box-frame is wholly open. The "kindling" is placed on the grate, and in a very short time after applying the match to it the fire

lescription of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Fig. 1 is a vertical longitudinal section of a stove patented by us at previous dates, with our improvements of the present date applied to it.

Fig. 2 is a perspective view of the fire-brick throat of the fuel-supply reservoir.

Fig. 3 is a perspective view of the portable auxiliary grate, on which the fire is first built to start the fire in the main grate.

Fig. 4 is a vertical transverse section of the whole stove.

Fig. 5 is a horizontal section looking upward.

Similar letters of reference in the several figures indicate corresponding parts.

The nature of this invention, which is an improvement on our stove patented May 7, 1861, and re-issued February 4, 1863, consists, 1st, in the construction of an illumination-window, or windows, at one or more points in the continuous flame-expansion chamber or channel which is about the base of the coal-supply reservoir and the top of the coal-burning fire-pot, in combination with a descending flue which leads to a chamber about the base of the stove, and from such chamber into a chimney-flue.

It consists, 2d, in the construction of a damper draft-flue in the continuous flame-expansion chamber or channel, located as just stated, in combination with a descending flue, which first leads down into a chamber about the base of the stove, and then into the chimney-flue, with which the damper draft-flue connects directly at the top of the fire-pot.

It consists, 3d, in the construction of the throat of the fuel-supply chamber of two rings of segment or angular form in their cross-section, and of fire-proof material, fitted between the rings, all in such manner that the throat of the reservoir is supported on the interior of
56 the stove, and forms a continuation of the fire-pot, and still not be a fixture, so far as bolts or other fastenings, which will not yield to expansion and contraction, are concerned, with either the stove or the fuel-reservoir.

It consists, 4th, in a poke-hole in the fire-pot, which has an angular branch-hole leading down into the ash-pan pit, whereby the live coals which are liable to fly out upon the floor when the poker is moved back and forth, are conducted down into the ash-pit.

It consists, 5th, in the adaptation of a portable grate with inclined top, a box-frame and legs and a handle, for use in combination with base-burning reservoir-stoves, whereby the starting of the fire in such stoves, although the supply-reservoir may be charged, is rendered a very convenient and ready matter.

It consists, 6th, in providing the ash-pan with apertures in its circumference, at opposite points, so that the poker may be inserted through these holes, and the pan carried out with hot ashes in it without liability of burning the hands.

To enable others skilled in the art to make and use our invention, we will proceed to describe the same with reference to the drawings.

As the main features of our present stove are shown in the letters-patent granted to us on the date heretofore mentioned, we do not deem it necessary to describe here anything more than those parts which we regard as essential changes and improvements on the stove described in said patent.

Our first improvement is carried into practice by casting the fire-pot A with a rectangular, elliptical, or circular extension, *a*, at one or more points of its upper edge. This enlargement we extend through an

OF THE UNITED STATES.

CASE 125.

WM. HAILES and ELLEN F. TREADWELL,

vs

JASPER VAN WORMER,
MICHAEL McGARVEY,
ABRAHAM MANN and
JOSEPH C. BARNES.

Argument for Appellees,

By CHARLES M. KELLER.

NEW YORK:
DAVIS & CORSON, Printers, 39 Nassau Street.
1873.

Oct 2 1873

Supreme Court of the United States.

NO. 125.

WM. HAILES *et als.*,
Appellants,

vs.

JASPER VAN WORMER *et als.*,
Appellees.

STATEMENT OF THE CASE, AND BRIEF OF ARGUMENT ON THE PART OF APPELLEES.

This suit is under two patents for alleged improvements in stoves.

The first is a re-issue, dated February 3d, 1863, granted on the surrender of the original, dated May 7th, 1861. It is marked Exhibit B.

(Record, pp. 16 to 22.)

And the second was granted August 11th, 1863, and is marked Exhibit C.

(Record, pp. 22 to 26.)

The answer of the respondents below will be found

(Record, pp. 8 to 13.)

They deny, as to both patents, the novelty and patentability of the matters claimed, and refer to numerous prior patents, and to persons having knowledge of the

prior use of stoves, involving all the essential features of the said alleged improvements.

They deny the charge of infringement, and, on information and belief, they deny that the validity of either of the said patents has been sustained.

The stoves described in the two patents at issue, and the one claimed to infringe, belong to the class of stoves known as "Base Burners," or self-feeders, and so termed because they are provided with a tubular magazine, or reservoir of coal, located above the fire pot, and containing a considerable charge of coal, introduced through the upper end, which is then closed with a cover. The lower end of this feeder is open, and, as the coal is consumed, the fire pot is replenished by gravity from the feeder or reservoir, and the combustion takes place in the fire pot, below the lower end of the said feeder or reservoir.

DESCRIPTION OF THE STOVES PRESENTED IN THE TWO PATENTS AT ISSUE.

Of the Stove in Patent, Exhibit B.

The stove described and represented in this patent consists of a fire pot, larger at the upper end than at the lower end; a grate at the bottom, with an ash pan below, to catch the ashes that drop through the grate, and open to admit the draught which passes up through the grate and charge of coal. Above the fire pot there is a feeder of cylindrical form, provided with a cover at the upper end, through which the charge of coal is introduced, and it is contracted at the lower end, which is about on a level with the upper edge of the fire pot. The space all around the upper edge of the fire pot is enclosed, to form what is termed the flame expansion chamber, which chamber extends up and connected with the outside of the lower part of the feeder; and from this chamber there are two descending flue tubes, one on each side, which extend down and connect with a hori-

zontal flue chamber in the base of the stove; and from this horizontal chamber there is a vertical flue pipe at the back, leading to the chimney, so that the products of combustion in this, as in all revertible flue stoves, rise from the surface of the ignited coal in the fire pot, and over the upper edge thereof, pass into the flame expansion chamber, down the two revertible flue tubes, to the flue chamber below, and then up the vertical flue pipe to the chimney. The cover of the feeder is double, and, from the space between, there is a horizontal pipe leading to the vertical flue or exit pipe which leads to the chimney, so that, when the inner cover of the feeder (marked A on the drawing) is opened, the draught from the fire pot will be directly through the charge of coal in the feeder to the space (F) between the two covers, and through a short horizontal pipe (G) to the vertical pipe (E) that leads to the chimney. In this way the stove is changed from a revertible to a direct flue stove, just as all revertible and direct draught stoves have been made, without a feeder, long prior to 1860. The entire stove is surrounded by a cylindrical casing, having apertures for the admission of air to be heated, as is common in many stoves known and used prior to 1860.

In this stove there is a serious and fatal defect. The object of a self-feeder or reservoir is to supply coal to the fire pot, but not to burn the coal within the reservoir, because it is not provided with any outlet to the chimney, when the direct draught is closed, and the revertible draught is opened; but, as the direct draught is through the reservoir or feeder, there is no way in which the direct draught can be used without igniting the coal in the feeder. This obvious defect was cured afterwards in patent Exhibit (C).

Of the Stove in the Patent Exhibit C.

This stove differs from the one in patent Exhibit B, only in the addition of mica windows to admit light into the room from the fire in the fire pot, and in adding a flue for the direct draught, instead of causing the pro-

ducts of combustion to pass through the feeder or reservoir, when kindling or exciting the fire in the fire pot.

(Record, pp. 22 to 26.)

Description of the Stove, Complainants' Exhibit (*A*), which represents the stoves made and sold by appellees, and charged to be made in infringement of the patents B and C.

This stove consists of a fire pot, with solid walls and a grate at bottom, which fire pot rests necessarily on a base. The fire pot is surrounded by the outer casing, which is not perforated, and placed at such distance as to leave an annular flue space all around between it and the fire pot, which flue space communicates with a flue space in the base of the stove, and this, in turn, communicates with a vertical flue pipe leading to the chimney. From the annular space above the upper edge of the fire pot there is a short lateral pipe, with a damper, leading into the vertical flue pipe, which conducts the products of combustion to the chimney. When the damper in this short lateral pipe is opened the draught is direct, and when closed, the draught is revertible—that is, the products of combustion then pass over the upper edge of the fire pot, down the annular flue space, all around between the outer casing and the fire pot to the base of the stove, and thence up the vertical flue pipe to the chimney. There is in front and immediately above the upper edge of the fire pot, illuminating openings covered with mica, through which the fire and flame can be seen.

So far, appellees' stove was known as the "American Gas Burner," and such stoves were extensively manufactured and sold by appellees long before the alleged invention of appellants. Such is the uncontradicted evidence. And to this kind of stove appellees simply applied a feeder, or reservoir, to supply coal to the fire pot, instead of supplying the coal by a shovel, hod or scuttle. And the questions to be determined are: First, whether, by so doing, they have infringed any legal rights of appellants, and second, whether this was done before or after the alleged inventions of appellants.

OF THE STATE OF THE ART IN EVIDENCE, AS KNOWN PRIOR TO THE DATE OF THE ALLEGED INVENTIONS DESCRIBED AND CLAIMED IN THE PATENTS AT ISSUE:

First.—The Nott stoves, which acquired such celebrity all over the civilized world, were all self-feeders, and constructed according to the various plans shown in defendants' Exhibit No. 14. The patent was granted to Dr. Mott, as early as the 25th day of October, 1832. The construction and mode of operation of the Nott stove is described by the witness Samuel Pierce, who, between 1832, and 1835, superintended the puting up of the Nott stoves in New York.

(Records, questions 16 to 21, pp. 63, 64, 65.)

A vertical cross-section of the Nott Saracenic Grate, was made by consent from the stove, Exhibit 7, a copy of which will be found at the end of this brief.

Although this is termed a grate, it was nevertheless a close stove.

Such stoves were made in New York prior to 1835.

(Record, pp. 59, 60.)

In all the Nott stoves there is a fire pot, which, by preference, is square in its horizontal section, and with a grate at the bottom; they have a feeder above, and which, in cross-section, is of less area than the fire pot. The products of combustion pass from the fire pot through a space between the inner edge of the fire pot and the outer surface of the feeder, into a flame expansion chamber, thence descend in a revertible or downward flue, and then up in a vertical flue to the exit pipe. From the side and near the upper end of the feeder there is a lateral flue leading to the exit pipe, and by means of dampers the stove can be used as a direct or a revertible flue stove. In front there is an illuminating mica door, protected by a grating inside.

Second.—The Mott stove, Exhibit 8. Such stoves were made and used as early as 1837 and 1838. This is proved by Charles J. Shepard.

(Record, pp. 59, 60; questions 3 to the end.)

By consent sectional drawings were made from this stove, copies of which will be found at the end of this brief. The construction and mode of operation of this stove is described by the witness Samuel Pierce.

(Records, p. 64; questions 21 to 25.)

Third.—The McGregor Stove, represented by model, Exhibit 6. Such stoves were extensively manufactured and sold as early as 1847.

(Records, p. 59; questions 2 to 8.)

A copy of the patent granted January 7, 1846, to McGregor, with drawings, will be found.

(Record, pp. 81 to 84.)

The stoves, such as described in this patent, were manufactured with a feeder, as represented in the model, Exhibit 6; and as so manufactured the stove is described by the witness, Samuel Pierce, who was familiar with its construction and mode of operation.

(Record, pp. 64 and 65; questions 22 to 31.)

Fourth.—The stove represented by model, Exhibit 9. Such stoves were made as early as 1850, for cars of the Hudson River Railroad. The model is a correct representation, except that the illuminating windows were lower down, and more spread. The feeder was conical or tapered towards the lower end, and the fire-pot was more shallow.

(Records, pp. 60, 61; questions 2, 3, 4, and p. 76.)

This stove is described by the witness Samuel Pierce.

(Record, question 31, p. 65.)

It is a base-burning stove, with the lower or delivery end of the feeder contracted, and considerably smaller than the upper end of the fire pot. It has illuminating windows with mica, and has revertible flues.

Fifth.—The stoves described in an English patent, granted to Harper & Walker in the year 1839, and in a French patent granted to Walker in the year 1849.

(Records, pp. 77 to 81.)

The leading features of the stoves described in these patents are stated by the witness Samuel Pierce.

(Records, questions 32 to 35, pp. 65, 66.)

Sixth—Letters Patent granted to Joseph C. Henderson, May 29th, 1860; re-issued, September 1st, 1868, Defendant's Exhibits 11, "12."

(Records, pp. 88 to 91.)

The features of this stove are pointed out by the witness Samuel Pierce.

(Records, question 35, p. 66.)

Seventh.—Letters Patent granted to S. B. Sexton, April 19th, 1859, Defendant's Exhibit 9; "re-issued December 3d, 1861, Defendant's Exhibit 10."

(Record, pp. 83 to 88.)

This is another of the numerous family of self-feeder or base burning stoves, but it is more remote than any of the others from the subject-matter of the patents at issue.

POINT I.

THE EVIDENCE SHOWS THAT THE FOLLOWING FEATURES IN STOVES WERE KNOWN, AND FREE TO BE USED BY ANY ONE IN THE CONSTRUCTION OF STOVES, BEFORE THE DATE OF THE ALLEGED IMPROVEMENTS DESCRIBED IN THE PATENTS AT ISSUE.

First.—The fire pot, with non-perforated walls, a grate at bottom, and open at top for the combustion of fuel,

(with an ash-pan below for the reception of ashes, and admission of draft to the fuel,) made either of equal size from top to bottom, or larger at the upper than at the lower end, and square or round in the horizontal section.

The selection of form, size and material, was a matter of judgment or fancy on the part of the constructor. On this subject, see testimony of Samuel Pierce,

(Record, question 37, p. 66.)

Second.—The feeder was well known as a means of supplying coal, by gravity, to the fire pot, as consumed therein, instead of by a servant with a scuttle, hod or shovel, and whether made of equal size from top to bottom, of a regular taper, largest at the upper or at the lower end, or of equal size from the top to within a short distance from the delivery end, and then contracted, and placed with the delivery end on a level with, or a little above or below the upper edge of the fire pot, with any desired amount of flame space between the inner surface of the surrounding case and the inner surface of the feeder.

The selection of any of those in the construction of a self-feeder or base-burning stove, was a matter of choice, to be governed by judgment or fancy. See testimony of Samuel Pierce.

(Records, questions 57 to 63, p. 69.)

Third.—Illuminating openings, that is, openings covered with mica, which is transparent, and not materially injured by heat. These have long since been used in stoves, and located, according to the form of the stove, where most light will be radiated into the room from the incandescent coals and flame.

The use of this device does not increase the heating capacity of a stove, but merely renders a stove more cheerful. See testimony of Samuel Pierce.

(Records, questions 49 to 52, p. 68.)

Fourth.—Revertible and direct flues. The revertible flues of a stove are the passages for the products of combustion from the fire-pot or chamber of combustion, on the

way to the chimney, for the purpose of radiating heat. There are direct, revertible and horizontal flues. What is known as the "direct draught," is an arrangement of flue by which the products of combustion are caused to pass in the most direct course from the fire pot to the chimney, and the "revertible draught" is an arrangement of flue by which the products of combustion are caused to revert or descend, after leaving the fire pot, and before ascending to the chimney. Stoves are generally made with both arrangements, that is, with direct and with revertible flues, controlled by dampers; the "direct draught" being used to start the fire, and after the coal is sufficiently ignited, the damper is closed and the revertible flue opened, that the products of combustion may pass in contact with, and heat a greater extent of surface, and thereby radiate a greater amount of heat in the apartment. The extent of such flue surfaces is a matter to be determined by the judgment of the constructor, who must take into consideration the size of the fire pot, the kind of fuel likely to be used, and the draught of the chimney.

The arrangement of the draught, whether direct or revertible, has no relation whatever to the mode in which the fuel is supplied to the fire pot, either by a feeder or by a servant with a scuttle, hod or shovel, and it would be as reasonable in the one case to claim as an invention the combination of a revertible draught with a servant having a scuttle or shovel in hand, as to claim the revertible draught in combination with the well-known feeder. Nor is there any relation whatever between the revertible draught and the illuminating openings, as it is not the draught which requires to be illuminated. The light is derived from the fire and the flame. The relation of the illuminating openings is with the fire pot or chamber of combustion, and in all stoves in which illuminating openings have been used, they have been combined with the fire pot and chamber of combustion, and were used in such combination long prior to 1850. Nor is there any relation between the illuminating openings, the revertible draft, and the special form of the delivery end of the feeder, or the form of the inside of the fire

pot; when wanted, they are to be placed where the fire gives the most light, and the revertible draught is free to be used with any form of fire pot, with or without a feeder, and with or without illuminating openings. See testimony of Samuel Pierce

(Records, questions 52, 53, p. 68.)

Fifth.—Flame Expansion Chamber. This is a mere enlargement of the space between the edge of the fire pot and the flues. Ever since Benjamin Franklin made the stove known as the "Franklin Stove," or fire-place, every well constructed stove and fire-place has been made with such an enlargement, and without going outside of the limits of the base burners, this feature is found in several of the stoves referred to in the state of the art, but not under the specific construction found in patents Exhibit B and C.

POINT II.

Appellants have not infringed patent Exhibit B.

There are twelve claims in this re-issued patent, but the charge of infringement is limited to the first five claims, no evidence having been put in as to the remaining seven claims.

OF THE FIRST CLAIM.

(Record, p. 21.)

This claim, if construed broadly, claims not only what has been, but what may be hereafter invented, and for that reason is void. (O'Reiley *vs.* Morse, 17 Howard). But it may be held to be valid, if construed, as it was by the Court below, limited to the means described in the patent; that is, when the feeder is formed with an outer

flange, connected with a like flange on the upper edge of the fire pot, to form what is termed in the patent a flame expansion chamber, provided with two downward flue pipes leading to the flue space in the base of the stove.

(See first paragraph on page 19 of the record.)

So limited, this claim is not infringed by appellees' stove, Exhibit A.

But, on the assumption that the claim is neither so broad as to be void on its face, nor so narrow as to be limited to the specific means described, but so broad as not to be limited to a stove with a flame expansion chamber interposed between the upper edge of the fire pot and the lower part of the feeder, the question then arises whether such a claim has been infringed. On the assumption last stated, what are the conditions specified in the claim? It must be "a base burning coal supply reservoir stove." This condition is found in all the stoves put in evidence on the state of the art.

Another condition is, that the products of combustion must pass "down outside of the fire pot towards the base of the stove, and out through a main draught flue, which leads directly from a space or chamber about the lower part of the stove." This condition is found, also, in the Nott stoves, particularly the "Saracenic Grate," the "McGregor stove."

(See testimony of Samuel Pierce and of M. P. Darsch, before referred to.)

There is still another condition. The stove must be so constructed "that the products of combustion do not pass up around and above the supply reservoir."

This condition is not found in the stoves of the appellees, but, on the contrary, when the direct draught is in operation in the stove Exhibit A, the products of combustion cannot reach the exit pipe, without passing up in contact with the reservoir or feeder.

It follows that by the very terms of the claim appellees do not infringe.

OF THE SECOND CLAIM.

(Record, p. 21.)

This claim is for the contracting of the discharge end of the coal supply reservoir, the expanding of the fire pot, and the extending of the flame passage downward for united operation in a base-burning coal supply reservoir stove or furnace, essentially as specified. It calls for three conditions in a base-burning stove, which conditions are claimed as if in combination. These three conditions have no relation to each other, and hence cannot be claimed in combination. The making of the feeder with the delivery end contracted, and the fire-pot enlarged at the upper end, have no relation whatever to the direction of the draught, whether upward or downward. As before stated, the mode of supplying coal to the fire pot of a stove, whether by a servant with a scuttle, hod, or shovel, or by a feeder, has nothing to do with the arrangement for directing the course of the products of combustion. This is proved by the witness Samuel Pierce.

(Record, Ints. 52, 53, p. 68.)

Changes in the form of the feeder and of the fire pot, and their relative size, are not matters requiring the exercise of inventive genius, but merely of skill and judgment on the part of the constructor, unless such changes result in a different mode of operation, which is not pretended in the present case.

Hailes, one of the patentees, gives as a reason for contracting the delivery end of the feeder or reservoir and enlarging the upper part of the fire pot, that it was to prevent the weight of the column of coal in the feeder from pressing too heavily on the coal in the fire pot, as in the feeder of a stove previously seen by him without such contraction, and that the defect was cured by contracting the delivery end of the feeder and enlarging the upper end of the fire pot.

Beyond all question the enlarging of the upper end of the fire pot could not prevent the coal in the feeder from

descending with too much force. But it is proved by Samuel Pierce, and not contradicted, that in the Nott stoves the feeder was made without such contraction, and yet it was found necessary to put a weighted follower on the coal in the feeder to insure the descent of it into the fire pot.

(Record, Ints. 61, 62, p. 69.)

OF THE THIRD CLAIM.

This claim will be found

(Record, p. 21.)

This claim is for a fire pot whose walls are not perforated, and resting on a base, and so applied with respect to a feeder as to form an enclosed gas and flame chamber all around and above the upper edge of the said fire pot.

A fire pot with perforated walls and resting on a base, and used in combination with a feeder, and forming a gas and flame chamber in the space between the outer casing, and the fire pot is found in nearly all the base-burners referred to in the state of the art.

The Nott, the Hudson River Railroad car stove, (defendants' Exhibit 9). The Mott stoves, except that the chamber does not extend all around; the McGregor, as made, proved by Pierce; the stove described in the French patent, granted to Walker; see specially figures 12 and 16 of the drawings, and the Littlefield stove, Exhibit 196.

This claim, as construed by the Court below, is limited to the combination of the fire pot, feeder, and chamber for the expansion and circulation of the flame and gases, when this chamber is formed by a projecting flange from the feeder resting on a flange from the upper edge of the fire pot, and provided with two flue tubes connected with the flue space in the base, for the revertible or downward draught.

So construed, the stoves made by appellees (Exhibit A) do not infringe, because they have no such chamber,

but, instead, the products of combustion pass over the upper edge of the fire pot, and down the annular space between the outer surface of the fire pot and the outer casing of the stove, as in the American gas burner, manufactured by appellees long prior to the alleged invention of appellants.

Any other construction of this claim than the one given by the Court below would void the claim for want of novelty.

OF THE FOURTH CLAIM.

This claim will be found.

(Records, p. 21.)

As one of the essential elements of this claim, as of the third claim, is the flame expansion and circulation chamber or passage, around the upper edge of the fire pot, and the lower end of the feeder, if construed as by the Court below, it is not infringed by appellees, and if not so limited, it is void for want of novelty. The same reasons apply to this as to the third claim.

OF THE FIFTH CLAIM.

This claim will be found

(Record, p. 21.)

This claim, stripped of extra verbiage, is simply for the feeder and fire pot with solid walls, and made larger at the upper than the lower end, in combination with descending or revertible flues.

Unless this claim be limited by construction, as by the Court below, to the two flue pipes extending down from the flame expansion and circulation chamber, as one of the elements of the combination, it is void for want of invention.

So limited, this claim is not infringed by appellees, for the reasons given in reference to the third and fourth claims.

So limited, the claim is valid, because the feeder and the fire pot are connected to form the flame expansion

and circulation chamber, and the downward flue pipes are connected with, and extend down from that chamber; but irrespective of such construction, the feeder has no combined relation with the downward (revertible) draught, and, legally, even if never before used in a revertible draught stove, cannot be claimed in combination with such direction of the draught.

The flue space for downward draught in relation to the fire pot in stoves like Exhibit A (appellees'), is precisely the same as in the American gas burner, and it is in proof that as early as 1857, and hence before the date of appellants' alleged invention, appellees applied the feeder or reservoir to one of the American gas burners. The stove so altered was in use during the Winter of 1857 and 1858, and afterwards was exhibited to their customers, who were informed that they would manufacture such stoves.

See testimony of Van Wormer

(Record, questions 2 to 7, pp. 30, 40.)

Of Michael McGarvey

(Record, questions to the end, pp. 57, 58).

Of Michael Bulger

(Records, pp. 34, 35.)

Of Joseph C. Barnes

(Records, questions 7 to 17.)

POINT III.

APPELLEES HAVE NOT INFRINGED PATENT EXHIBIT C, DATED AUGUST 11, 1863.

This patent will be found (Record, pp. 22 to 26).

There are six claims in this patent, but no evidence was offered tending to prove the infringement of any other than the first and second.

OF THE FIRST CLAIM.

This claim is found

(Record, p. 25).

This claim is for the combination of the illuminating openings, *flame expansion chamber*, coal supply reservoir, fire pot, descending or revertible flue, and direct draught flue.

This presents a combination of six elements or devices, and the stove described in this patent is so much like the stove described in patent, Exhibit B, that it becomes necessary to inquire what part was added to the stove of the prior patent, Exhibit B.

In the patent, Exhibit B, will be found the flame expansion chamber, the feeder or coal supply reservoir, the fire pot, descending flue, and draught flue. The only thing which has been added is the illumination openings, to give light in the room.

As the state of the art in evidence clearly establishes that, long prior to the alleged invention described in patent, Exhibit B, by complainants, stoves were formed with openings covered with mica, to permit the fire to throw light into the room, and that these glazed openings are usually located where the most light will be given by the fire, the application of such glazed openings to the stove described in appellants' patent, Exhibit B, did not require invention.

OF THE SECOND CLAIM.

This claim will be found

(Record, p. 25.)

It is for adding to the stove of the patent, Exhibit B, a flue for direct draught from the flame expansion and circulation chamber to the exit pipe, and controlled by a damper. This was to cure a serious defect in the stove described in patent, Exhibit B, before pointed out, as the only direct draught in that stove, for kindling and exciting the fire, had to pass through the charge of coal

in the feeder or reservoir. This defect necessity for and the modification is proved by Mr. Hailes, one of the patentees

(Record, pp. 31 and 32).

As construed by the Court below, both the first and the second claims are limited to combinations, one element of which is in the very terms of the patent, "A flame expansion chamber, formed at the base of the coal supply reservoir, and around the upper edge of the fire pot." And as there is no such chamber in the stoves made by appellees, they cannot be held to have infringed. But if not so limited, these claims are void for two reasons:

First.—For want of novelty, as appellees not only added a coal reservoir or feeder to the American Gas Burner, and so used it during the Winters of 1857 and 1858, before the alleged invention of the stove described in patent Exhibit C, but followed it up by the construction of others. This is proved by the witnesses named in reference to claim 5th of patent, Exhibit B.

Second.—For want of invention. As mica windows were long before used in stoves for throwing out light from the fire, and they have relation only to the fire chamber, they cannot be legally claimed in combination, either with the feeder or with the direction of the draught.

And so with the direct and revertible draught flues, they have no relation to the feeder, or to the windows. They have relation to the fire chamber, because their function is to distribute the heat generated in the fire chamber, and they perform that duty in the same manner whether the coal is supplied to the fire pot directly by a servant with a shovel or from a reservoir feeder.

As well claim an ornament on the outside of a stove in combination with the feeder, as the illumination windows, or the direction of the draught with the feeder.

Aggregation is not combination within the meaning of the law.

POINT IV.

APPELLEES ARE THE ORIGINAL AND FIRST INVENTORS OF WHAT IS FOUND IN THE STOVE EXHIBIT A CHARGED TO BE AN INFRINGEMENT OF THE PATENTS AT ISSUE, IF, IN VIEW OF THE STATE OF THE ART IN EVIDENCE THERE BE ANY INVENTION IN THE MATTERS AT ISSUE.

As early as 1854, or 1855, appellees Van Wormer and McGarvey began to manufacture the stove known as the "American Gas Burner," and continued to manufacture and sell such stoves from that time onward.

Exhibit No. 1 is one of the said stoves. A perspective view and vertical section of that stove will be found appended to this brief.

This stove consists of a fire pot with solid walls and a grate at bottom, which fire pot rests, necessarily, on a base. The fire pot is surrounded by the outer casing, at such distance as to leave an annular flue space all around between the two, which flue space communicates with a flue space in the base of the stove, and this in turn communicates with a vertical flue pipe leading to the chimney. From the space above the upper edge of the fire pot, there is a short lateral pipe, with a damper leading into the vertical flue pipe, which extends to the chimney. When the damper in this short lateral pipe is opened the draught is direct, and when closed the draught is revertible, that is, the flame and gaseous products of combustion then pass over the upper edge of the fire pot, down the annular flue space all around to the base of the stove, and thence up the vertical flue pipe to the chimney. There is in front and immediately above the upper edge of the fire pot illuminating openings covered with mica, through which the fire and flame shed light into the room.

It will be noticed that this stove has all the features of the stoves charged to have been made by appellees in infringement of patents, Exhibits B and C, with the exception of a feeder, and some slight variations in shape.

In the Fall of 1857, Van Wormer and McGarvey applied to one of these stoves a feeding-tube, as seen in Exhibit No. 1. This feeder was a tube made of sheet iron, open at both ends, and with a rim or flange at the upper end, by which it was suspended from the top plate—such stoves being made with a large central hole in the top plate, provided with a cover.

The stove, so provided with a feeder, was used for about one or two months during the Winter of 1857 and 1858 and worked successfully. The feeder being made of sheet iron could not be so durable as if made of other material, but the material of which a feeder is to be made is no part of the claims at issue. This stove was shown to customers. No other alteration was required in the American Gas Burner than to add the feeder.

And although the stove, Exhibit No. 1, was not used after the Winter of 1857 and 1858, it was after that frequently explained to customers, who were informed that appellees intended to manufacture such stoves.

See testimony of Jasper Van Wormer.

(Records, p. 39; questions 2 to 15, p. 56.)

Michael McGarvey.

(Records, p. 57; questions 2 to 9.)

Michael Bulger.

(Records, p. 35; questions 1 to the end.)

Jas. C. Barnes.

(Record, p. 37; questions 8 to 16.

At the time of putting a feeder into the American Gas Burner, Van Wormer and McGarvey were acquainted with the state of the art as in evidence in the record.

(Record, p. 42; questions 32 to 37.)

This was done prior to the date of the alleged invention of appellants, who only began to make experiments with gas burners in 1858 and 1859.

(Records, p. 31

In applying the feeder to the American Gas Burner, in 1357 and 1858, appellees were the first to make and use a stove in which were aggregated the following features, viz.: First, a fire pot, with closed walls, resting on a base; second, a feeder or coal reservoir; third, a downward or revertible draught, passing all around over the upper edge of the fire pot, down in the annular space between the fire pot and the surrounding casing of the stove, thence into a horizontal flue space, in the base of the stove, and then upward in a flue pipe, outside, to the chimney; fourth, a direct draught pipe leading to the chimney, with a damper, and, fifth, illuminating mica windows to shed light into the room.

If the aggregation of all these old devices in one stove, in view of the state of the art, is, in judgment of law, a patentable combination, then it follows that appellees cannot be held to be infringers, without, at the same time avoiding the patents at issue for want of novelty.

It will be noticed that the stove, Exhibit A, differs only from the stoves, Exhibits B and C, in the fact that it has not the flame expansion chamber, formed at the base of the coal supply reservoir, and around the upper edge of the fire pot, with two flue pipes leading to the base, but instead, has simply an annular space between the fire pot and the outer casing of the stove, just as in the old American Gas Burner. And from this it follows that if the claims in the patents, Exhibits B and C, are limited, as they were by the Court below, to combinations in which this flame expansion chamber is an element, the stove, Exhibit A, does not infringe either of the claims in question; but if the claims shall be so construed as to make the annular space between the fire pot and the outer casing in Exhibit A, the equivalent of the flame expansion chamber of the patents, Exhibits B and C, then the stove, Exhibit No. 1, will defeat the claims at issue in the said patents, Exhibits B and C, for the want of novelty.

It may be contended that the stove, Exhibit No. 1, was not perfected, because it was not continued in use after the Winter of 1857 and 1558.

The answer to this is that it was not continued in use

because the feeder was made of sheet-iron instead of more refractory materials. Appellees showed it to their customers, and informed them that they were going to manufacture such stoves. And they followed up this by the construction of other stoves, Exhibits Nos. 2, 3, 4 and 5, all having the same aggregation of devices, and only modified in the form of the parts and in some of the details not involved in the issues, but all of these stoves were practical working stoves.

The evidence shows that the application for the original patent on which the Re-issue, Exhibit B, was based was filed March 2, 1861.

(Records Exhibit, No. 16 *b*, pp. 94, 99.)

This application was based on the first stove made by them in the Winter of 1860, and 1861, and called the "Citadel." After many objections by the Commissioner of Patents, the patent was finally granted May 7th, 1861, on very limited claims. Wm. Hailes, one of the patentees, says (of the Citadel), "This stove was defective in its operations."

(Record, p. 31.)

They then made another in 1862, called the "Excelsior," and Hailes says of this, "that it operated better than the Citadel," but that there were still objections to it.

(Record, p. 31.)

They then, after 1862, made other modifications, and among others, providing for the direct draught by a lateral flue pipe leading to the exit pipe, instead of through the charge of coal in the feeder, as in the patent of 1861. And Hailes then, after these modifications, says, "We sought to secure these improvements with others by reissuing our former patent, and making application for another patent, which was granted August 1863, Exhibit C. This stove did not altogether meet the demands." And then they made the stove called the "Brilliant,"

which was submitted to Rathburn, the manufacturer, in the Fall of 1865.

(Record, p. 32.)

From this it appears that appellants did not complete their alleged invention until the Fall of 1865.

On the evidence it is respectfully submitted that any features or combinations, or aggregations in appellees' stove, Exhibit A, which may be found in the patents, Exhibits B and C, were first produced, and reduced to practice by appellees, and that the decision of the Court below should be affirmed, and the bill of complaint dismissed with costs. A copy of the opinion of the Court below will be found appended to this brief, and marked Appendix A.

CHARLES M. KELLER,
Of Counsel with Appellees.

APPAREILS DE CHAUFFAGE PAR M. WALKER.

Vol. XVI. France, Brevets D'Invention, 1854, Pl. XXXV, p. 267.

FIG. 12.

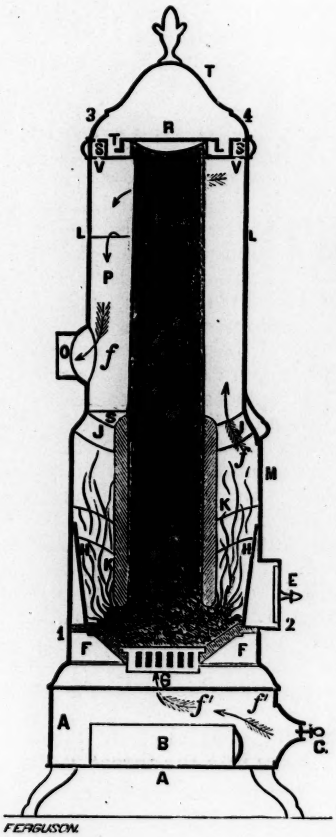


FIG. 13.

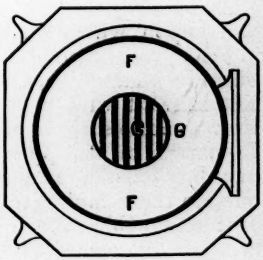


FIG. 14.

Figure 14 is a second horizontal section made in the upper part at the height of the line 3—4. 346

It is seen by these figures that the apparatus which I call hearth, or self-feeding hearth is composed of several distinct parts, among which I have especially to call attention to the bowl (bassin) or basin at the bottom A, which forms the hearth properly so called and the conical inner shaft K.

The basin F, which I suppose to be of cast iron, circular in form might be constructed of some other metal or of any other form. At its centre it has a grate G, the bars of which are at convenient distances to give passage to the currents of air which come from the outside by opening the regulator C, applied in front and at the lower part of the base A, of the apparatus and where the ash box is at B. 347

A covering or shirt on the inside, H, rises over the bowl, upon which it rests for the purpose of protecting the external covering M, and preventing it from burning. This external covering is provided on one side in front with a mineral glass or pane E, which allows one to see the flame or the fuel while ignited. It sustains on its upper base a similar shirt L, which may be of a smaller diameter, and which forms on the outside the complement of the stove or heater. 348

It is capable, like the first, of being more or less ornamental, according as the apparatus is to be used, either in rich apartments or in places less exposed to observation. A kind of bell or metallic covering closes in entirely on top and a hole on the side, O, for a pipe, is opened at the side to communicate with the chimney, which receives the smoke and the burnt gases arising from the combustion. 349

Above the basin F, which contains the burning coal is the internal conical shaft K, of which I have spoken. This conical shaft sustained in one direction by the covering H, and in the other by the crown in casing J, which joins the outer envelope M, to the upper one L, is completely filled with coke or coal at pleasure, which cannot burn up because there does not exist an inner current of air. 350

Thus, at its top it is closed by a hand cover R, the cylindrical edge of which enters into the throat T, of the diaphragm S, which is itself previously filled with

FIG. 15.

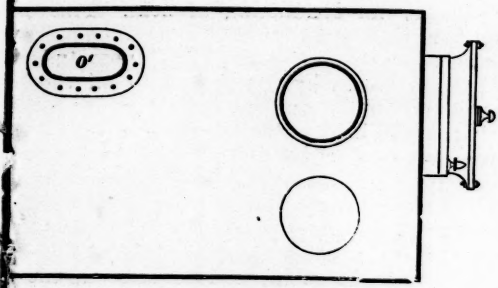
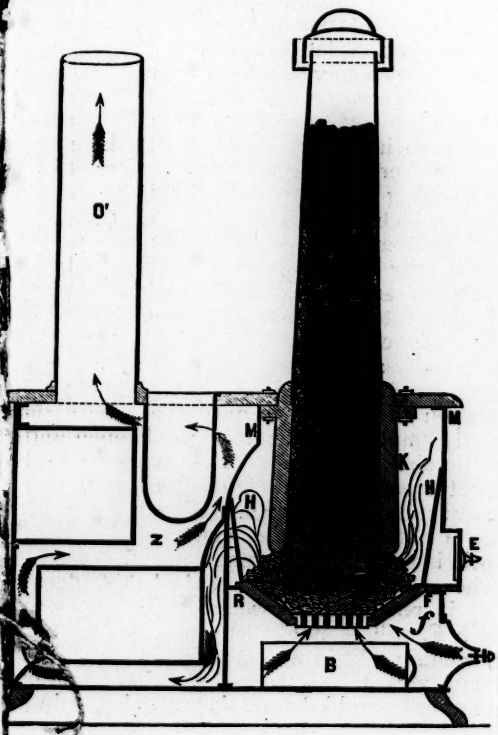


FIG. 16.



351 fine sand or any other powderous matter which h
little affinity for conducting of heat. This circul
diaphragm is pierced with oblong openings whi
allow of cleaning the inside of the apparatus witho
taking it to pieces by simply taking off the bell
upper cover. The form or size of these openings
clearly marked in the plan.

From what precedes it is easy to understand h
such an apparatus operates. It is sufficient first of
352 to fill the conical shaft K, with combustibles, eith
of coke or coal, placing previously in the bowl or bas
F, some chips or other materials that will easily tak
fire, then to light them, and to close up the whol
opening to a certain extent the regulator C.

The flame produced by the combustion does no
rise up in the interior of the side of the conical shaf
because it is completely closed at the top, and that i
consequence no current exists there.

353 It is forced to spread itself at first along with th
smoke in the covering H from whence it rises rapi
in the covering M, and thence into the upper one
and from there it descends by the conduit P, into th
pipe opening O, which conducts it off into the draf
chimney. The smoke and the burnt gases resultin
from the combustion then follow thus the directi
indicated by the arrows *f*, while the cold air to fe
the hearth enters by the opening of the regulator C
354 and penetrates under the grate G, following the di
rection of the arrows *f'*.

Gradually as the lower portion of the fuel is con
sumed, its place is immediately supplied by that whic
lies upon the top of it, until the conical shaft K, i
entirely emptied, which does not happen until after
considerable long time. The combustion thus con
centrated occurs in an extremely uniform manner,
consequently very economical, and a great degree
355 heat is obtained in the apartment, because all th
caloric is perfectly well made use of.

The coke or coal in the conical shaft does not bu
until it reaches the lower part that is to say, to th
baisin F, still it might on account of not being very
dry contain a little water, which would be reduced t
vapour while the apparatus was in operation, in thi
case there would be no inconvenience in making

Fig. 1.

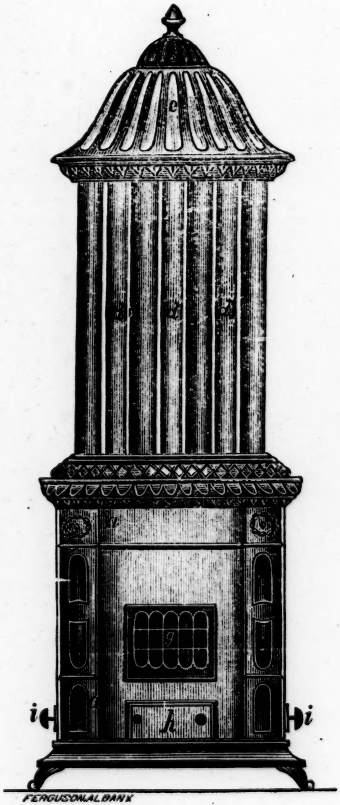
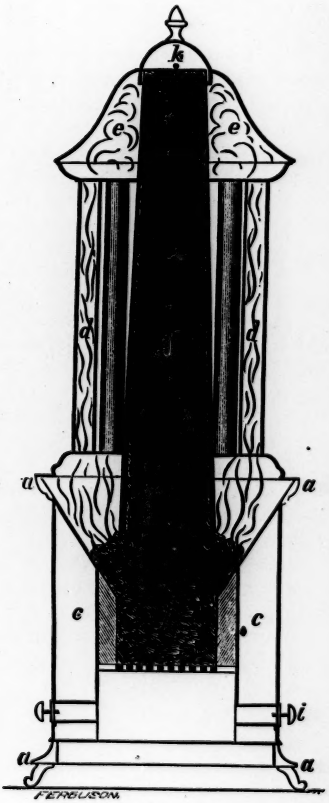


Fig. 2.



From the upper part of the stove or grate, *a*, *a*, ascend a series of tubes, *d*, *d'*; the tubes *d*, being ascending ways and the tubes *d'* being the descending ways, through which the heated vapors pass to the chimney, and by this means a very extended surface is heated and becomes the heating means of the atmospheric-air, in the room or place in which the stove or grate is placed, for it will be seen that the atmospheric air can circulate amongst the tubes *d*, *d'*, and become heated by the external surfaces thereof. The series of tubes *d*, *d'*, enter into a chamber, *e*, consequently the vapours in passing from the fire place, all ascend through the tubes, *d*, into the chamber, *e*; and from that chamber, *e*, such heated vapours pass down the tube *d'* and enter the flue *f*, which may pass away at a point below the stove or grate, or at an intermediate point as is indicated by the dotted lines, or even higher up. We would remark that the number of tubes, *d*, *d'*, may be varied according to their size and the extent of heating apparatus desired to be obtained. *g*, is a door or frame in front of the fire place which is glazed with sale, and *h*, is a small door to remove the ashes: the doors *g*, and *h*, should fit closely as possible to admit little air: *i*, *i*, are air-ways by which the supply of air to support combustion may be regulated: and it should be stated, that when the stove is a close stove or grate, as above described, all parts should be as air-tight as possible to prevent air entering to support combustion except at the openings *i*, *i*.

The fuel is supplied to the fire place through the tube or way, *j*, which has a cover *k*, fitting into a circular groove or recess filled with sand: but whatever be the supply of fuel, the ignition will not ascend into the tube *j*, if the same be kept air tight; and the fuel we prefer to burn is anthracite or stove coal; or coke of bituminous coal.

Having thus described our invention, we would have it understood what we claim as our invention is, the mode herein described of applying a series of tubular flues and chamber *e*, to stoves or grates.

In Witness whereof &c.

Enrolled November [illegible] 1839.

TRANSVERSE SECTION OF FIGS. 1 AND 2.

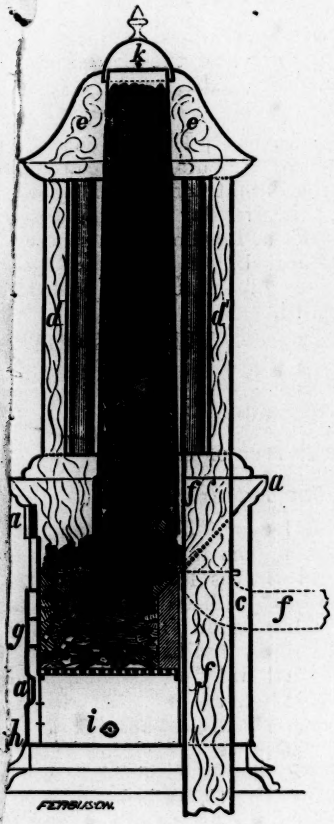
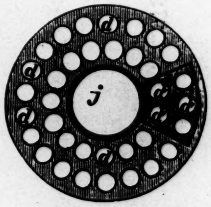


FIG. 3.



From "The Repertory of Patent Inventions," New Series, Vol. 13, 1840, London.

371

DEFENDANTS' EXHIBIT No. 8*b*.

THE UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, greeti

372 *This is to certify*, that the annexed is a true c from the Records of this office of the Letters Pa Granted to James MacGregor, Jr., January 7, 1 No. 4350.

In testimony whereof, I, Elisha Foote, C missioner of Patents, have caused Seal of the Patent Office to be hereu [SEAL.] affixed, this first day of September 373 the year of our Lord one thousand ei hundred and sixty-eight, and of the dependence of the United States ninety-third.

ELISHA FOOTE

No. 4,350.

THE UNITED STATES OF AMERICA.

374 *To all to whom these Letters Patents shall come:*

Whereas, James MacGregor, Jr., Wilton, N York, has alleged that he has invented a new a useful Improvements in Stoves for heating Apa ments which he states has not been known or us before his application; has made Oath that he is Citizen of the United States that he does verily b lieve that he is the original and first inventor or d coverer of the said Improvement, and that the sai 375 hath not, to the best of his knowledge and belief, be previously known or used; has paid into the Tre sury of the United States, the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said Improvement and praying that a patent may be granted for that purpose:

JAMES McGREGOR, JR.,

Improvement in Stoves for Heating Apartments.

(Patented January 7th, 1846).

FIG. 2.

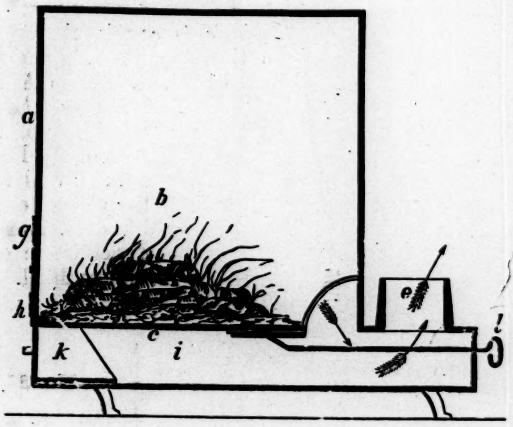
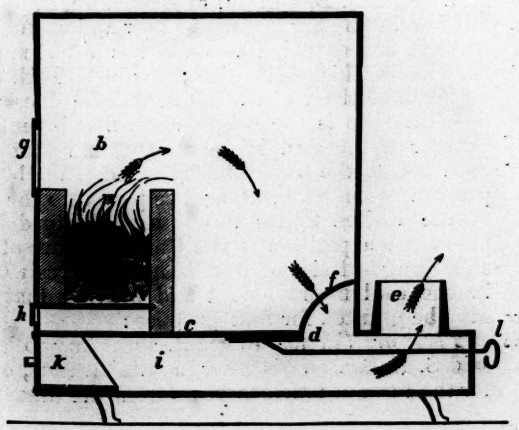


FIG. 3.



393 DEFENDANTS' EXHIBIT No. 9*b*.

THE UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, gree

This is to certify, that the annexed is a true
from the Records of this Office of the Letters Pate
Granted to S. B. Sexton April 19, 1859, No. 23,716.

394 *In testimony whereof*, I Elisha Foote Co
missioner of Patents, have caused t
Seal of the Patent Office to be hereun
affixed, this first day of September,
[SEAL.] the year of our Lord one thousand eig
hundred and sixty-eight and of the
395 dependence of the United States
ninety-third.

ELISHA FOOT

No. 23,716.

THE UNITED STATES OF AMERICA.

396 *To all to whom these Letters Patent shall come:*

Whereas, S. B. Sexton, of Baltimore, Maryland,
alleged that he has invented a new and useful Impro
ment in Stoves which he states has not been known
used before his application; has made oath that h
a citizen of the United States, that he does verily
lieve that he is the original and first inventor or
397 coverer of the said Improvement, and that the sa
hath not, to the best of his knowledge and belief,
previously known or used; has paid into the Treas
of the United States the sum of thirty dollars,
presented a petition to the Commissioner of Pate
signifying a desire of obtaining an exclusive prope
in the said improvement and praying that a pate
398 may be granted for that purpose:

These are therefore to grant, according to law, to t
said S. B. Sexton his heirs, administrators, or assig
for the term of fourteen years from the nineteenth d

S. B. SEXTON'S Improvement in Stoves.

(Patented April 19, 1859, No. 23,716).

FIG. 1.

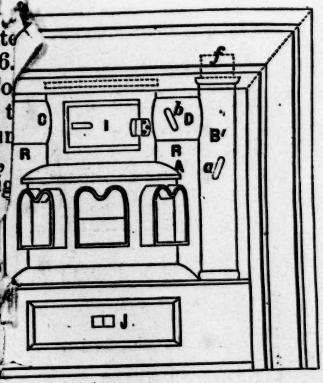


FIG. 3.

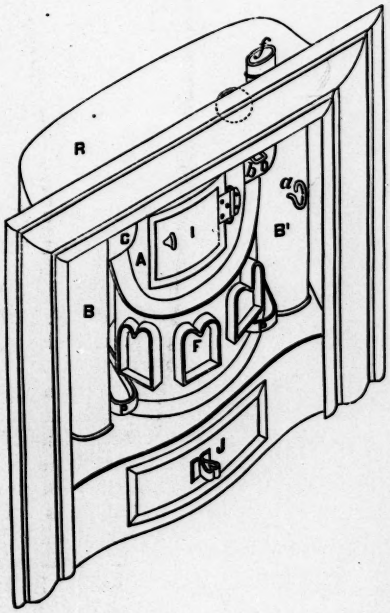
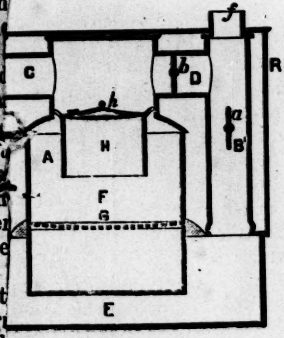


FIG. 2.



411

DEFENDANTS' EXHIBIT No. 10*b*.

THE UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, greeting

This is to certify, that the annexed is a true cop
from the Records of this Office of the Reissued Lette
412 Patent Granted to S. B. Sexton, Dec. 3, 1861, N
1242.

In testimony whereof, I, Elisha Foote, Com
missioner of Patents, have caused th
Seal of the Patent Office, to be hereunt
[SEAL.] affixed, this first day of September, i
the year of our Lord one thousand eigh
hundred and sixty-eight, and of the Inde
pendence of the United States the nin
413 third.

ELISHA FOOTE.

Reissue, No. 138. Whole No. 1242.

THE UNITED STATES OF AMERICA.

To all to whom these Letters Patents shall come:

Whereas, S. B. Sexton, of Baltimore, Maryland,
414 alleged that he has invented a new and useful I
provement in stoves. (For which Letters Patent w
issued to him dated April 19th, 1859, which Le
having been surrendered by him, the same have be
canceled and new Letters ordered to issue to him
an amended specification), which he states has
been known or used before his application; has ma
oath that he is a Citizen of the United States that
does verily believe that he is the original and fi
415 inventor or discoverer of the said Improvement, and
that the same hath not, to the best of his knowledge
and belief, been previously known or used; has paid
into the Treasury of the United States, the sum of
Thirty dollars, and presented a petition to the Com-
missioner of Patents, signifying a desire of obtaining
an exclusive property in the said Improvement, and
praying that a patent may be granted for that purpose:

J. C. HENDERSON, Improvement in Stoves.

(Patented May 29, 1860, No. 28,482).

FIG. 1.

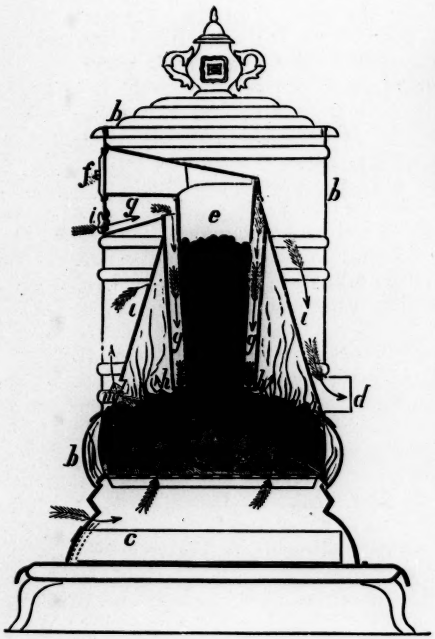


FIG. 2.

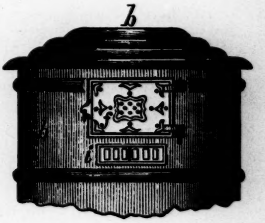
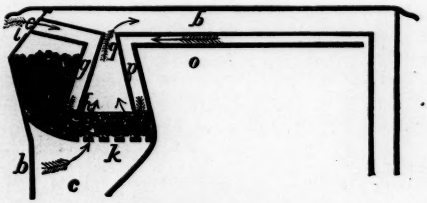


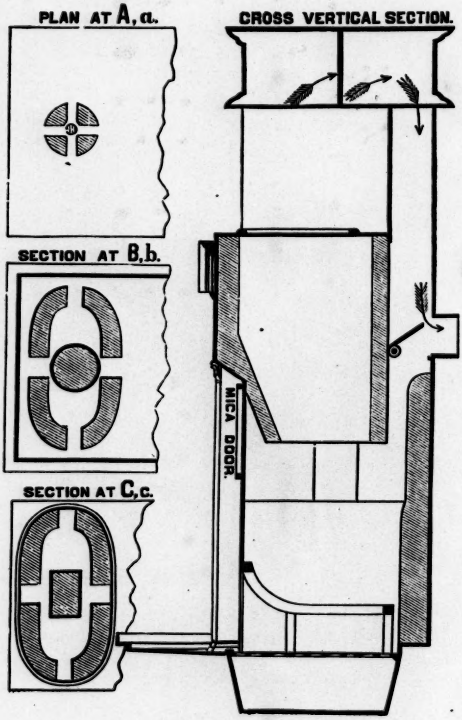
FIG. 3.

FIG. 4.

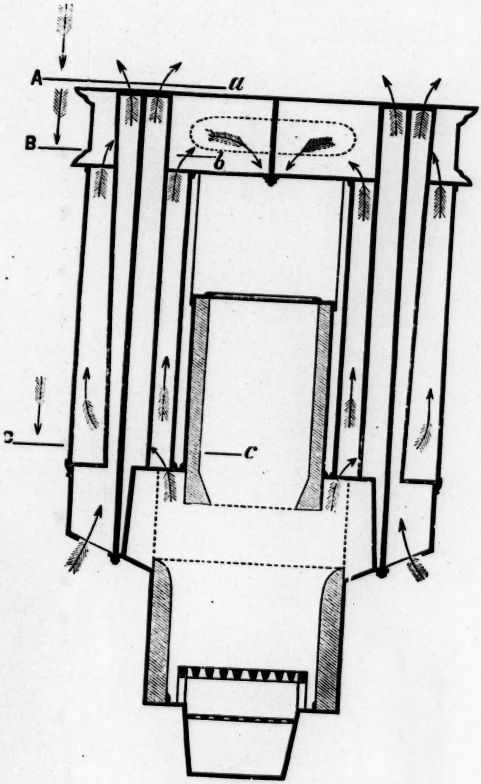


DEFENDANTS' EXHIBIT No. 18*b*.

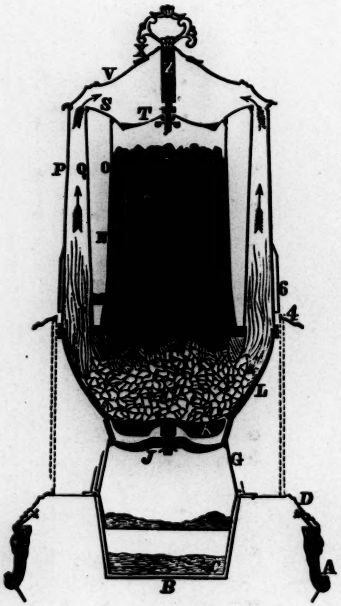
DRAWINGS OF THE J. L. MOTT STOVE, EXHIBIT 8.



LONGITUDINAL VERTICAL SECTION.



DEFENDANTS' EXHIBIT No. 19*b*.



JOHN G. TREADWELL & W. HAILES,

Improvement in Base Burning Stoves.

(Patented May, 7th, 1861, No. 1,253).

FIG. 1.

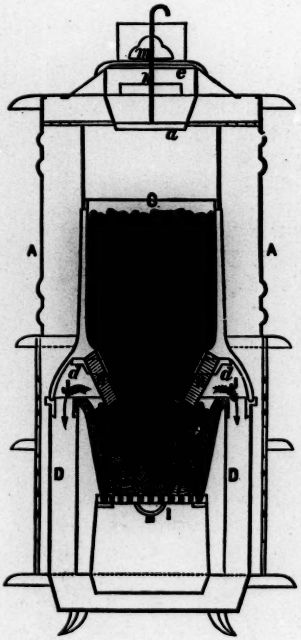
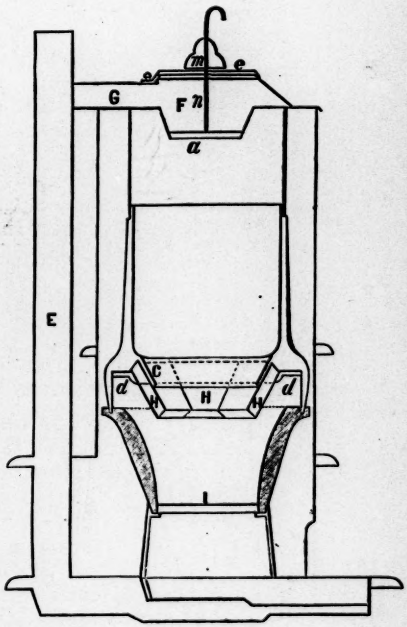


FIG. 2.



551

DEFENDANTS' EXHIBIT No. 17*b*.

THE U. STATES PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

552 *This is to certify*, that the annexed is a true copy from the Files of this office of the File and Contents in the matter of the Reissued Letters Patent granted Treadwell and Hailes dated February 3, 1863, No. 1,397. "Stoves."

In testimony whereof, I, J. H. Hodges, acting Commissioner of Patents, have caused the Seal of the Patent Office to be hereunto affixed, this thirtieth day of September, in the year of our Lord one thousand eight hundred and sixty-eight and of the Independence of the United States the ninety-third.

[SEAL.]

558

J. H. HODGES,
Acting Commissioner.

30 Cash 2 drgs. Old Pat.

554 *To the Commissioner of Patents:*

The petition of John G. Treadwell and William Hailes of Albany, in the State of New York, respectfully represents:

That they did obtain Letters Patent of the United States for an improvement in Base Burning stoves, or furnaces, which letters Patent are dated the seventh day of May, eighteen hundred sixty-one, that they now believe that the same are inoperative and invalid by reason of a defective specification, which defect has arisen from inadvertance and mistake. They therefore pray that they may be allowed to surrender the same, and request that new letters patent may issue to Ellen T. Treadwell and William Hailes, their assignees, for the same invention, for the residue of the period for which the

21 J. G. T. Dec. 30, 1862, $1.

555

DRAWINGS ANNEXED TO

COMPLAINANTS' EXHIBIT B.

JOHN G. TREADWELL, AND ELLEN T. TREADWELL, AND WM. HAILES, ASSIGNORS TO WM. HAILES.

Improvement in Base Burning Stoves.

(Reissued February 3d, 1863, No. 1,397).

FIG. 1.

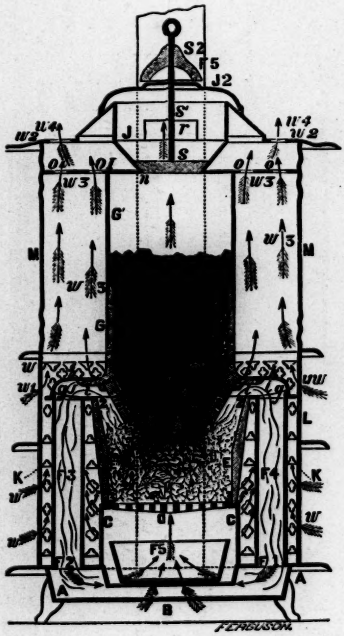
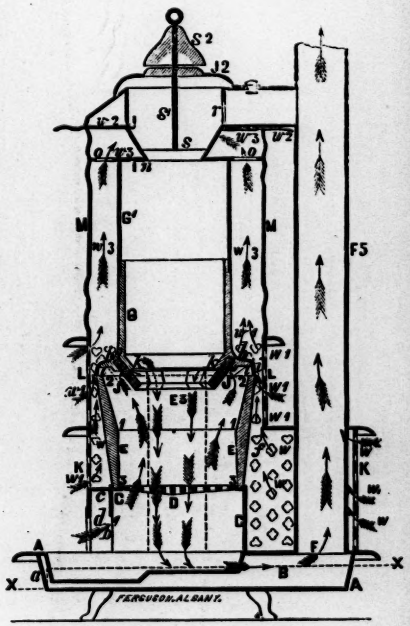


FIG. 2.



DRAWINGS ANNEXED TO

COMPLAINANTS' EXHIBIT C.

John G. Treadwell and Wm. Hailes. Improved Base Burning Stove.

(Patented August 11th, 1863, No. 39,535).

FIG. 1.

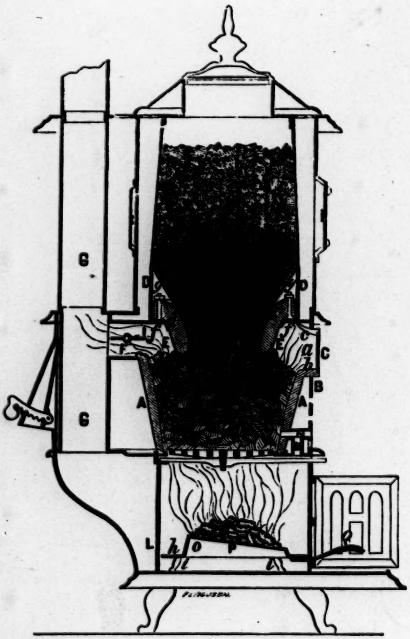


FIG. 2.

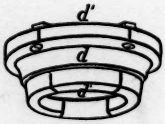


FIG. 3.

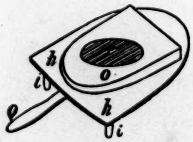


FIG. 4.

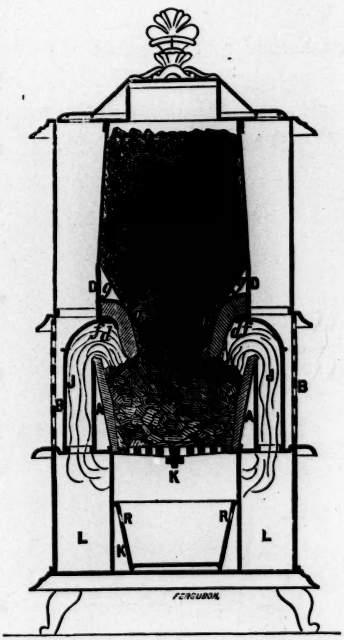
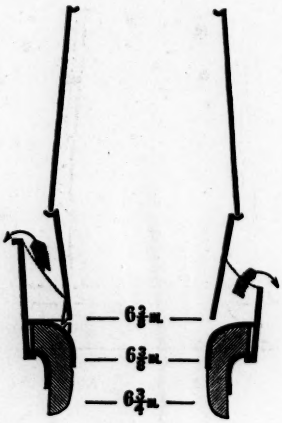


FIG. 5.

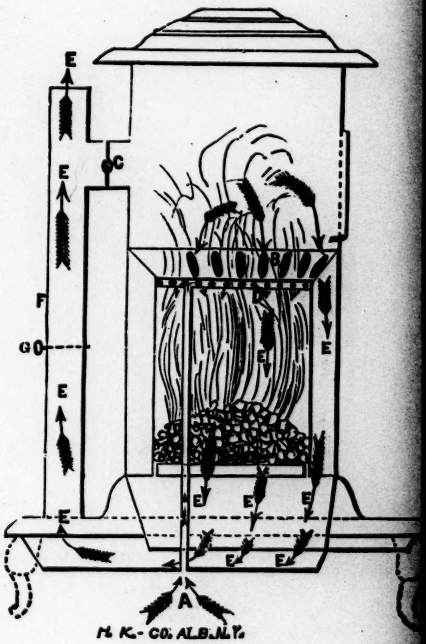
SECTIONAL VIEW OF THE FEEDER OR RESERVOIR IN THE STOVE,

DEFENDANTS' EXHIBIT No. 11,

i. e., the Latest Modification of "The Brilliant."



SECTIONAL VIEW OF THE AMERICAN GAS BURNER.



VAN WORMER & McGARVEY'S

ADJUSTABLE MAGAZINE STOVE.

(Patented May 1st, 1866, No. 54,447).

FIG. 1.

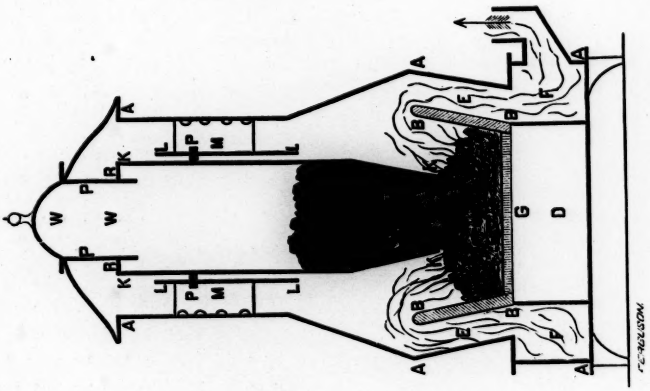
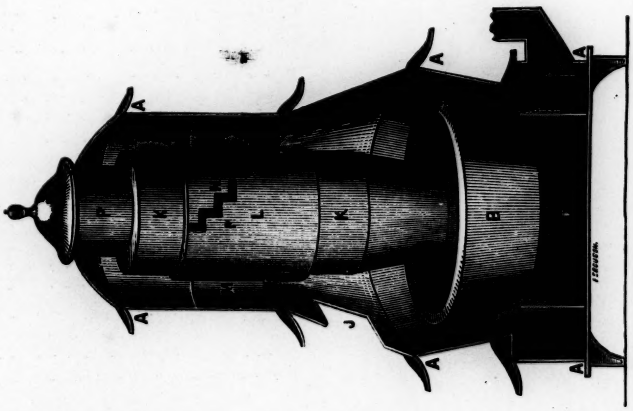
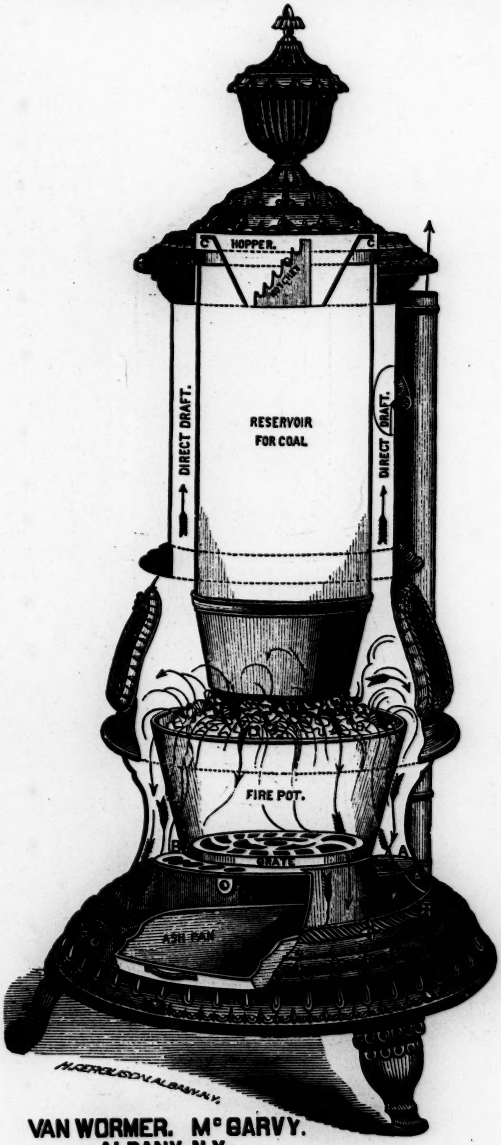


FIG. 2.



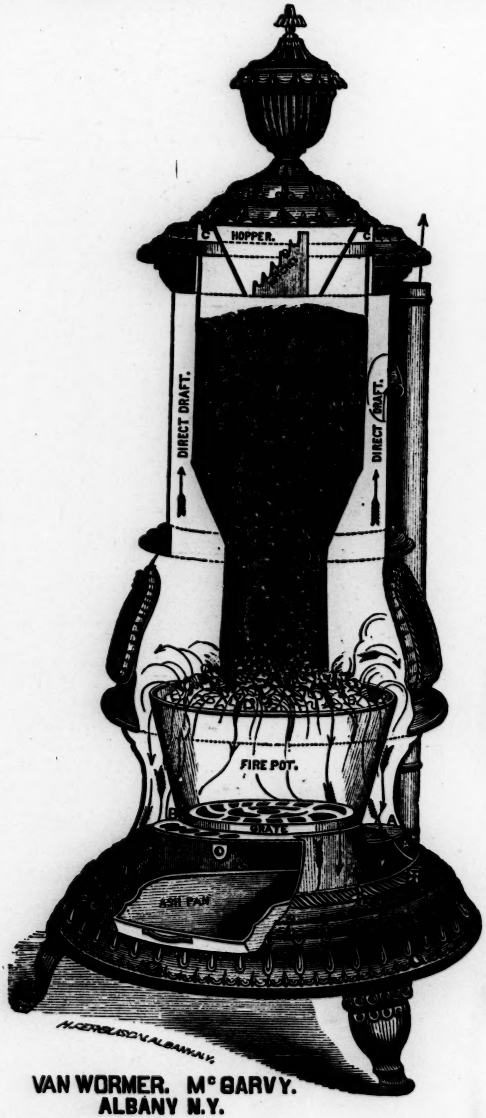
DEFENDANTS' EXHIBIT No. 4.

DEFENDANTS' EXHIBIT No. 4.

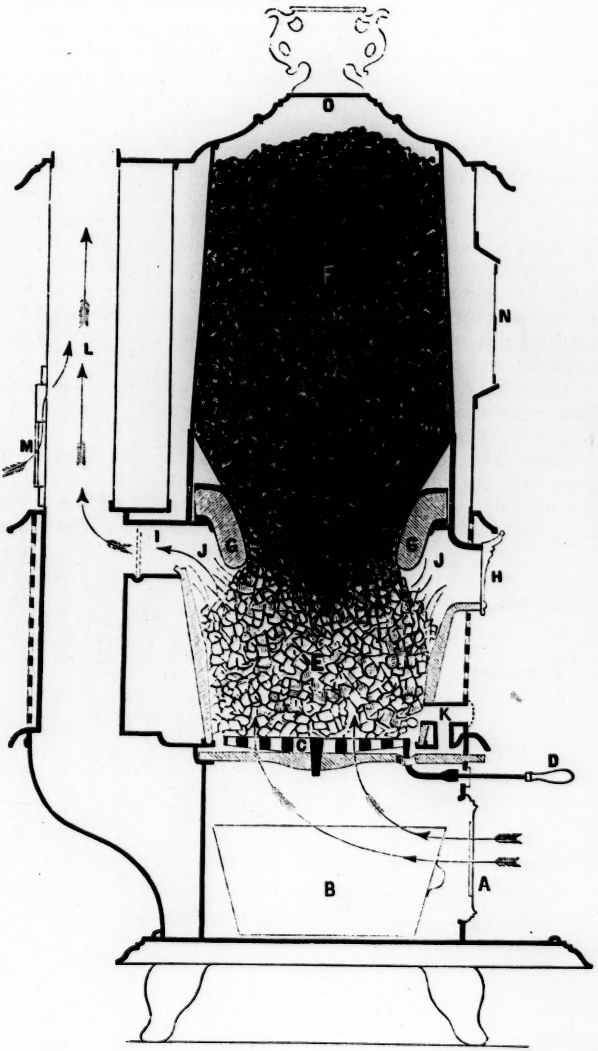


VAN WORMER. Mc GARVY.
ALBANY N.Y.

DEFENDANTS' EXHIBIT No. 5.



VAN WORMER. Mc GARVY.
ALBANY N.Y.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8th. The combination of a perforated jacket or casing —a coal supply reservoir with a contracted discharge— a fire-pot with a flame expansion chamber around and above its upper edge, and a descending flue or flues, and a main draught flue, substantially as and for the purpose described. 118

9th. The combination, in a base burning coal supply reservoir stove, of a descending flue or flues, and a perforated casing, substantially as and for the purpose set forth.

10th. In a base burning coal supply reservoir stove or furnace, we claim a branch flue, opened and closed by a damper, above the base of the fire-pot, in combination with a descending passage or passages leading to the lower part of the stove, and with the main draught flue leading out of the lower part of the stove, substantially as and for the purposes set forth. 119

11th. The weight constructed and applied in connection with the damper valve, in the manner and for the purpose set forth.

12th. The combination of the perforated jacket or case, the reservoir for coal, the fire-pot, the descending flue or flues, the hollow space about the base of the stove, and the chimney flue, whereby the base of the stove is heated by direct heat of the flame or gasses, and the upper part of the stove by radiated heat acting upon the circulating air, substantially as described. 120

JNO. G. TREADWELL,
WILLIAM HAILES.

Witnesses:

W. W. CRANNELL,
C. VAN ALLEN. 121

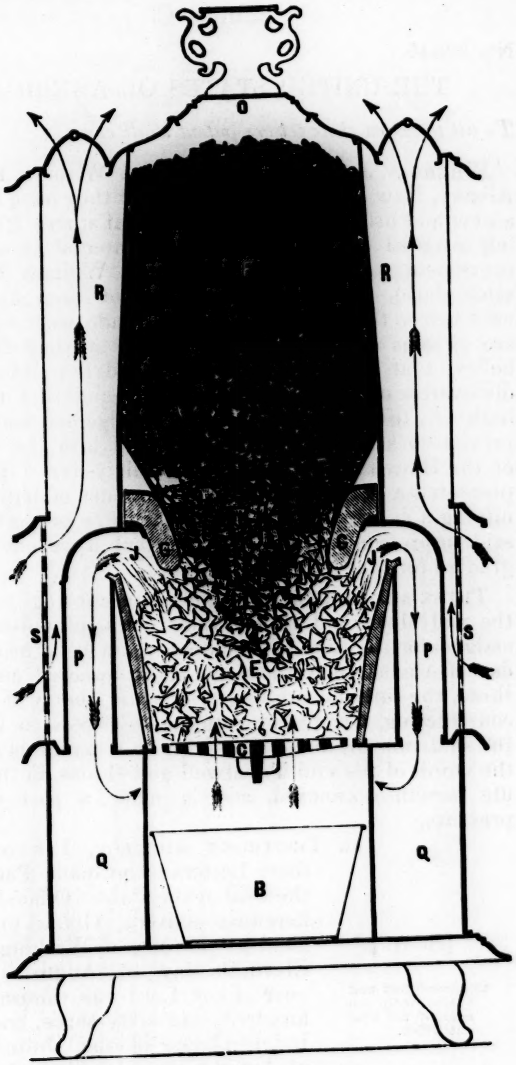

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EXHIBIT C.

122 No. 39535.

THE UNITED STATES OF AMERICA.

To all to whom these letters patent shall come:

WHEREAS, John C. Treadwell and William Hailes of Albany, New York, have alleged that they have invented a new and useful improvement in coal stoves (they having assigned their right, title and interest in said improvement to Martin L. Mead and William Hailes of same place), which they state has not been known or used before their application, have made oath that they are citizens of the United States, that they do verily believe that they are the original and first inventors or discoverers of the said improvement, and that the same hath not, to the best of their knowledge and belief, been previously known or used; have paid into the treasury of the United States the sum of thirty-five dollars, and presented a petition to the commissioner of patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose.

THESE ARE THEREFORE to grant according to law to the said Mead and Hailes, their heirs, administrators or assigns, for the term of seventeen years from the eleventh day of August, one thousand eight hundred and sixty-three, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Treadwell and Hailes, in the schedule hereunto annexed, and is made a part of these presents.

IN TESTIMONY WHEREOF, I have caused these Letters to be made Patent, and the Seal of the Patent Office has been hereunto affixed. Given under my hand at the city of Washington, this Eleventh day of August, in the year of our Lord one thousand eight hundred and sixty-three, and of the Independence of the United States of America, the eighty-eighth.

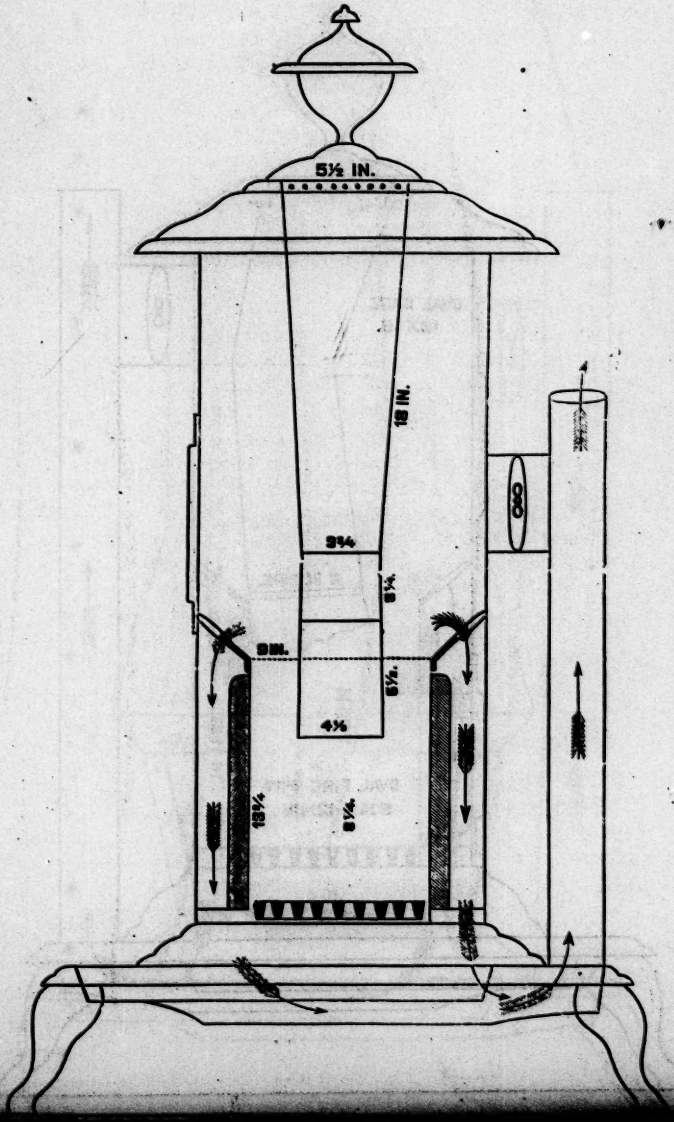
[SEAL.]

Countersigned and Sealed with the Seal of the Patent Office.

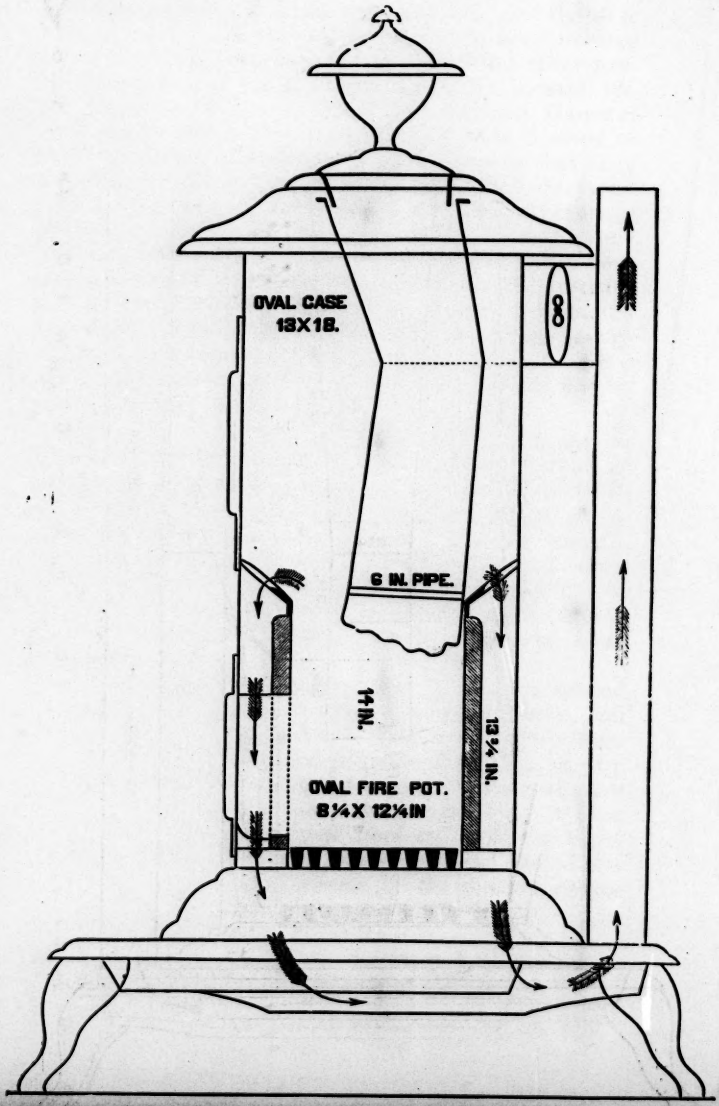
J. P. USHER,
Secretary of the Interior.

D. P. HOLLOWAY, *Commissioner of Patents.*

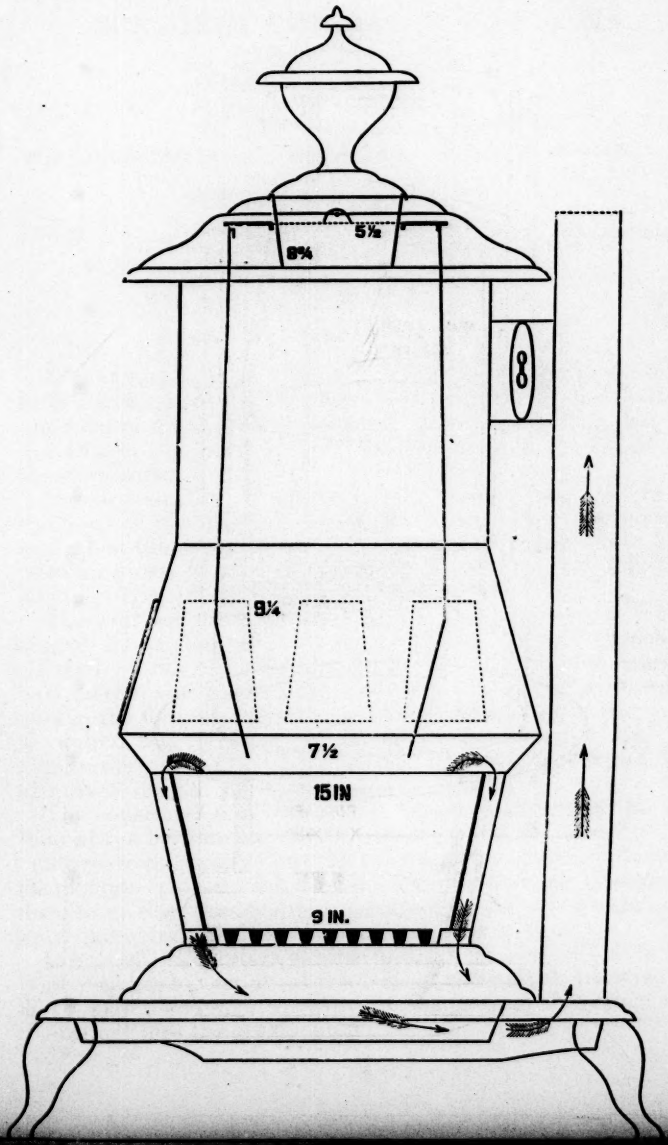
American Gas Burner, with the sheetiron feeder, as put in by defendants, Van Wormer & McGarvey, in the winter of 1857, 1858, and used more or less for exhibition, &c.



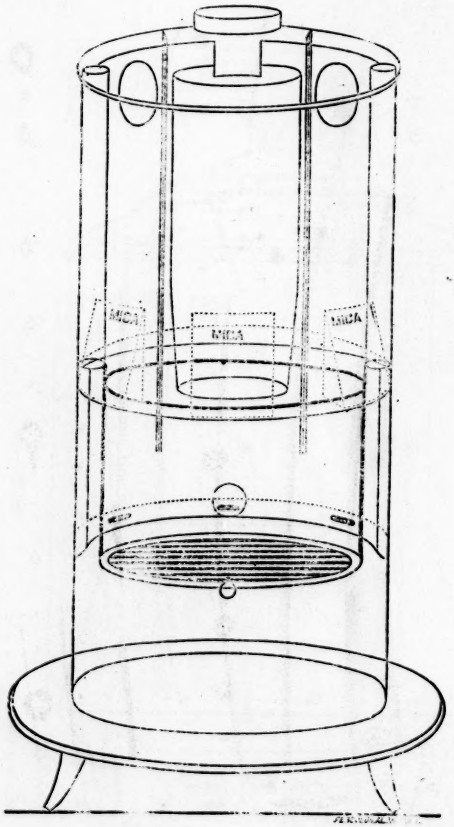
American Gas Buruer, with sheetiron feeder, as altered and used by way of experiment in 1861, 1862, by defendants, Van Wormer & McGarvey.



Defendants, Van Wormer & McGarvey's stove, as made by way of experiment in 1864 and 1865.



Representation of the model of the Sanford stove, as altered near the close of examination of defendants witnesses.



CIRCUIT COURT OF THE UNITED STATES,

FOR THE

NORTHERN DISTRICT OF NEW YORK.

In Equity.

Wm. Hailes and Ellen T. Treadwell,	JOEL TIFFANY, for Complts.
against	
Jasper Van Wormer, Michael McGarvey, et al.	J. C. MCCLURE, Sol'r., for Defts., C. M. KELLER, of Counsel.

OPINION.

WOODRUFF, J. Upon a careful examination of the evidence in this case, aided by the very full and elaborate discussion of the counsel for the respective parties, I am of opinion that the defendants are guilty of no infringement of the rights of the complainants.

The introduction of a magazine or reservoir into a stove for the purpose of supplying coal to the firepot below was no novelty when the complainants claim to have invented their base burning stove in 1861 (see exhibits 6b, 7b, 8b, 9b, 10b, 11b. Exhibits 7, 8, 18b, 19b. Ex. 9 and 12).

The contraction of the lower end of said reservoir, so that it should be smaller than the upper portion thereof (which is claimed by the complainants to aid in sustaining the mass of coal therein and prevent too great pressure upon the burning coal in the firepot), is found in several stoves before that time in public use, (Harper & Walker's Speccifiation Ex. 7b. Henderson's Ex. 11b; J. L. Mott's, Ex. 18b; McGregor, Ex. 8b; Sanfords Ex. 12).

The construction of a firepot of larger diameter at the top than at the bottom was then not new (ex. 6b, 7b, 19b).

Stoves so constructed that the smoke, gas and other products of combustion passed from the fire chamber through downward flues to or near the level of the bottom of the stove were common, the revertible flues so-called had long been in use.

In one of the exhibits, describing the Sexton stove and in the American gas burner, these products of combustion were passed down and through a chamber in the base of the stove and thence out into the smoke pipe.

The addition of a direct draft to such stoves as were constructed with revertible flues by means of a flue above the firepot provided with a damper to be closed after the fuel had been ignited was no novelty.

(Besides the models and exhibits, the testimony as to these various points is quite explicit and is not contradicted).

The use of openings in the exterior or shell of the stove and the insertion of mica therein in order to permit the light emitted in the process of combustion to be seen, had been employed for very many years. (See the testimony, the stoves of Dr. Nott, J. L. Mott the American gas burner, testimony of Pierce, Sanford and Exhibit 14 b).

If there are any other devices in the stove patented by the complainant embraced within the details of the specification, the stove manufactured by the defendants does not contain them.

The stove of the defendants does now embrace all of these particulars in combination, and this use is claimed to infringe the complainants patent.

This claim, however, cannot be sustained unless it be true that the complainant has invented snch a combination of these old devices as precluded their introduction into the defendant's stove.

To determine this, it is necessary to examine the combination which the complainants allege and describe, and before doing so it is proper to say, that although a combination of old devices may be patentable when a new and useful result is produced, no one can by combining several, each of which are old, thereby deprive others of the right to use them separately nor of the right to use them in new combinations nor of the right to use some of them in combination, omitting others.

The complainants in their patent of 1861, did unquestionably combine all these several devices in some form. Their construction of a flue for the direct draft was, however, plainly and materially different from that of the defendants. It consisted of a flue leading from the chamber at the top of the magazine or feeder in such wise that in the process of igniting the coal, all the smoke, gas and other products passed through the coal before reaching the flue leading to the smoke pipe, and the same is true of the invention as exhibited in the drawings annexed to the patent as reissued February 3d, 1863.

But in their patent of August 11th, 1863, they have described the draft flue as leading directly from the combustion chamber over the firepot backward into the smoke pipe without leading the smoke, gas, &c., through the coal in the magazine.

Have they then secured such an exclusive right to the combination of these old devices that the defendants were precluded from employing such combination in their stoves at the times and in the manner they have introduced them?

1. The complainant's combination is not the simple union of these several devices to produce a new result, but their employment in combination with other devices producing a stove differing in many particulars from the stove of the defendants.

Thus the stove of the complainants has an exterior perforated casing or jacket which surrounds the radiating surfaces of the magazine, firepot and flues.

Of this it must suffice to say, it has no apparent connection with the invention alleged to be infringed; its declared object being to receive air through its perforations and discharge it (when heated by contact with or radiation from the firepot, descending flues and magazine) for warming the apartment or other apartments above to which it might be conducted. Nothing of this description is found in the defendant's stove.

Again the downward flue or flues in the complainant's patent are wholly exterior to the stove itself, and are separated from the firepot so as to leave a vertical space between them and the firepot, which when the outer casing is applied forms a part of the hot air chamber communicating with the external air which enters through the perforations before mentioned, and when warmed passes up and out at the top, and the existence of this space between the downward flues and the fire chamber is specifically pointed out in the complainant's specification.

There are no such exterior flues for the downward draft in the defendant's stove, and of course no such space around the firepot to which the external air can have any access.

The complainant's specification describes the downward draft for the passage of smoke and the other products of combustion to the bottom of the stove as pipes placed over apertures made in the top plate of the base of the stove, and extending upwards to the upper rim of the firepot, and connected therewith by perforated flanges or ears, not only so that a space is left between the pipes and the firepot as above stated, but such perforations form the outlet from the combustion chamber.

In the defendant's stove none of these devices exist. The space around the magazine and the firepot are tightly enclosed, and there is one entire continuous chamber from the top of the stove to the bottom of the fire pot (around the magazine over the surface of the coal and around the firepot) constituting an extended combustion chamber surrounding each, and through which the unconsumed smoke and gas pass upward to the top, and out when the direct draft is in use, and downward to the base of the stove when the direct draft is not desired.

In the stove described in the complainant's specification the base of the cylinder which forms the reservoir, terminates in a circular flange (l) projecting outwardly and then curved downward and fitted down upon the upper edge of the firepot so as to form a perfectly close circulating chamber or "flame channel," around the bottom of the magazine, and with no

communication upwards with the space around the magazine, nor downwards around the exterior of the fire pot, the only outlet therefrom being what are called perforated flanges or ears with which the downward pipes already referred to are connected. This, with its flange or ear passages constitutes as claimed, the combustion chamber, contrived to retain the products of combustion in immediate contact with the incandescent coal around the base of the reservoir, in which they may expand and in their passage to the outlet will be drawn over the surface of the coal, and their more complete combustion be effected.

Now, although very great stress was laid upon this feature of the complainants alleged invention I am clearly of opinion that there is no corresponding device in the defendant's stove, nor any infringement thereof, if the complainant's right to its exclusive use were conceded.

In their stove the magazine or feeder has no connection with the firepot, nor with the sides of the stove; communication with the upper part of the stove, around the magazine is not cut off by flanges or otherwise; the circulation and passage of the heated smoke, gas, and products of the combustion while the direct draft is in operation, are up and around the reservoir or feeder and their circulation and passage are down and arouud the sides of the firepot in immediate contact therewith when the downward draft is in operation. The combustion chamber consists of the entire space over the firepot not occupied by the reservoir, extending to the top of the stove, and the space downward around the firepot.

This arrangement does not embrace but excludes the effect claimed for the complainant's stove (viz: passing the products of combustion over and across the incandescent coal horizontally to secure their more complete combustion), by passing them directly over the edge of the firepot downward along its sides.

It is unnecessary to dwell upon the complainant's arrangement of the lower extremity of the reservoir or feeder by means of the ring flange (k), and the detachable ring (v), with a horizontal flange and bolts to form in their connection a frame for the reception of fire brick or other fire proof material.

These are, however, a part of the complainant's combination, and are not only a material part, but they are the immediate and sole agents or means of producing one of the new results, to wit: the protection of the lower extremity of the reservoir or feeder from destruction by the heat of the burning coals below. A result however not at all produced by the combination of a reservoir with a revertible flue and the firepot, and having no more fitting application to that combination than to any reservoir introduced into any stove.

However valuable and whether they do or do not produce a new result the defendants have not used them.

They employ the mere iron cylinder as a receptacle and conductor of the coal to the top of the firepot without any such protection.

2. Bringing thus into view the fact that the complainant's patents are not for the mere combination of a reservoir diminished in size at its outlet, with a flaring firepot and revertible flues and mica windows, but that these are used in combination with other devices, I observe that whatever new results are produced, they are due not to the combination of the first named four devices (which alone appear in the defendant's stove), but to those other devices which are used in combination therewith.

This renders some attention to the difference between mere aggregation of devices and their results on the one hand and a patentable combination of old devices which produces a new result or an old result in a better or more economical manner.

The mere addition of an old device producing a given result to another old device producing its own result, in such wise that their combination produces those same two results and no other is not invention.

For illustration, suppose the use of a firepot constructed of fire brick or like indestructible material was in common use in stoves having a direct draft only, its use being valuable because of its indestructibility and hence its economy.

And suppose also stoves constructed, with revertible flues are in like common use, the revertible flues around and under the base of the stove effecting as results a more perfect combustion and warming the lower part of the stove by the passage of the heated products of combustion around or beneath it and so warming the air in the room near the floor.

Adding or combining the firepot of fire brick to or with the stove having revertible flues would not be invention, no other results being thereby produced. The fire pot of fire brick would still produce its appropriate and original result, viz: it would be a more economical firepot; and the revertible flues would still produce their appropriate and original results, viz: more perfect combustion and the warming of the base of the stove and the air near the floor. But neither result would be due to the combination, nor would any result be produced that either separately did not produce.

On the other hand, if the combination itself produces a new and useful result not due to the separate action of either, nor attained thereby, a totally different question arises; for obviously all invention consists in new modes of employing what is before known, so as to produce thereby effects either not produced before or not produced in that manner, or not produced so usefully.

And so also if the combination of the old devices be supplemented by other and new devices cooperating therewith, and thereby a new and useful result is produced, not attained by the action of the old, there also is invention.

I therefore am not required (in order to the decision which I make) to hold that the complainants have no patentable invention. They have supplemented the combination of the devices already in use by constructing a close circular space immediately over the burning coal and around the lower end of the reservoir or feeder by extending flanges from the side of the feeder and connecting them with the upper edge of the firepot, so cutting off the ascent of the heated products of combustion and their access to the space above, around the sides of the magazine, and also as claimed compelling those products to pass horizontally over the incandescent coal to reach the outlet to the pipes placed outside and leading to the base of the stove. The two useful results of this arrangement as alleged, are 1st. A more perfect combustion of the smoke and gases rising from within the firepot; and 2d, the protection of the reservoir and coal therein from being overheated.

Now, these results are not due to the combination of the four devices which are included in the defendant's stove but to the supplementary device. Hence, the significance of the description and especially of the complainant's claim in these specifications, viz: not to the mere combination but to the combination in the manner and for the purposes set forth.

The defendants on the other hand use the four old devices in their stove, and in it they produce the appropriate and original results pertaining to each. That is to say, their stove is supplied with a space around the firepot leading to the base which forms the downward passage way thereto, operating to conduct the unconsumed products of combustion through the base to the smoke pipe, by this they secure the beneficial results long before attained by the use of revertible flues. But these benefits whatever they are, are not the results of the *combination*. They are just what revertible flues in any stove and in any combination are adapted to produce unless their familiar construction has produced other or greater benefits so as to be itself protected by their own patent which it is not material here to consider.

So they use a reservoir or feeder contracted in size at its lower end or at some point above. By this they secure the benefit of the contraction (if there be such benefit) in sustaining in part the mass of coal in the reservoir above, and also the enduring supply of coal to the firepot heated so as readily to ignite, but this was no new result, nor is it a result arrising from the combination in any sense whatever. Again, they use a flaring or funnel shaped firepot (ie., having a larger diameter at the top than at the bottom). Now, obviously, the diameter of the

fire pot at the top being fixed by its proper relation to the size of the discharge end of the reservoir or feeder, the result of contracting it at the bottom is to enable them to use less coal without diminishing the surface of the burning coal at the top, and there may be other results of using a fire pot with oblique instead of perpendicular sides. Whether this form is in any view useful, or to be preferred to the other form is left, to say the least, in great doubt, by the evidence, but that is not a point material to the view I am presenting, which is that those results are not the *results* of the *combination*, and as I have above stated the form is not new. The results flow from this form of fire-pot whether used in the defendant's stove or elsewhere.

What is above said applies with most obvious fitness to the openings closed with mica for the purpose of illumination. The office they perform are in the defendant's stove precisely what they have produced in other stoves for more than thirty years, viz: permit the light produced by the combustion to escape into the room, and if not made perfectly tight, then to permit the entrance of some atmospheric air into the fire chamber. These results have no relation to the combinations, are not due to it, and are not affected by it.

It follows, therefore, that however useful and valuable the complainant's stove may be, and whether they have or have not invented a patentable combination supplemented by new devices so that new results are produced or old results by new means or in a better manner, the defendants have done nothing to infringe any right the complainants have acquired.

3. I have thus considered the question of infringement by showing what the defendants do use in their stove, and that so far as is material to this case it consists in employing mica windows, a reservoir or feeder contracted in size at or above its lower end or place of discharge, a firepot having a larger diameter at the top than at the bottom, and a downward draft with a direct draft for the purpose of more speedy ignition of the coal.

That these were all old devices. That whatever the complainants may have accomplished in the construction of their stove, the defendants have not in this secured any new results nor employed any new modes of producing or of improving the separate result of each of these devices, and therefore that what they have done (so far as material to this controversy), is merely gathering these results into one stove without new devices for their accomplishment or altering or improving them as a result of combination.

And I have also shown some of the actual differences between the stove of the defendant and those patented by the complainants and that those devices introduced by the complainants in perfecting their combination make it a different and more comprehensive combination.

And the defendants have neither used such more comprehensive combination nor those other and additional devices which form a part of the complainant's stove as described in its specification.

And I ought to remark here, that in making the comparison it was of most essential importance to use the stove described in the complainants specification's and exhibited in the drawings annexed thereto and not the stove called "the Brilliant" which departs largely therefrom in most of the particulars which are distinctive features of their stove as described in their specifications.

It is moreover important to the right understanding of my decision and just also to the defendants that I should say distinctly that in saying that the defendants in their combination of the old devices contained in their stove have not by such combination produced new results, I mean that they have not produced such results by mere combination nor by the use of any devices embraced within the complainant's patent. I do not decide that their employment of the open circular space around the firepot as a chamber for the continued combustion, the flame and the descending unconsumed smoke or gases is or is not a new device producing the new and useful results claimed therefor in their own patent. This is also true in respect to the peculiar devices employed in their stove for adjusting the reservoir or feeder, also mentioned in their patent. The novelty or utility of what in their patent they claim to have invented, in the view I take of the question of infringement of the complainant's patent are wholly immaterial to the decision. These devices are not in the complainants patent.

This description is already very prolix and enough has been said to exhibit as I think sufficient grounds for the decision I am constrained to make. There are other points of difference between the stove of the complainants described in these patents and the stove of the defendants, which makes the departure from the complainant's aggregate combination still greater, but I deem it unnecessary to discuss them further.

As a mere combination of the devices which have been used by the defendants, and apart from the supplemental and auxiliary devices which the complainants introduced and claimed in their patents and which the defendants have not used, I am not at all satisfied that the Sexton stove does not embrace all that is useful in the stove of the complainant. It is a base burning stove, with revertible flues and a reservoir or feeder. The differences of form are obvious, but whether those differences are anything more than differences in form, and produce either new or useful results are left at least doubtful upon the evidence.

I have not deemed it necessary to consider the further fact that the defendants use a reservoir and feeder having an

enlarged mouth for the alleged purpose of preventing a clogging of the coal in its passage to the coal pot. It was not necessary because my conclusion is already reached upon other grounds.

4. Finally the counsel for the complainants on the hearing, and in his printed argument, frankly and in unequivocal terms admitted and repeated that "the defendants may apply the self-feeder to the American gas burner, or to any other stove, provided that in the organization and construction of such magazine stove they do not include the improvements patented by the complainants."

This concession accords perfectly with the views which I have above presented. The defendants were at liberty to use the reservoir or magazine together with a coal stove having revertible flues and also the direct draft for kindling the fire, and with mica openings for the purpose of illumination. Such without the reservoir was the American gas burner constructed by the defendants several years befere the complainant' spatent.

They were not at liberty to borrow from the complainants any patented devices employed by them, to produce new and useful results from the combination.

What have the defendants done that it is not here conceded they had a right to do?

In answering this it is material to observe that at the time the complainants received their patents both the American Gas burner and the stoves described by the complainants patents were of nearly or quite uniform size in their exterior from top to bottom, both, however, somewhat contracted in size at the base. The irregular and highly ornamental form since given to both has made an exterior resemblance which might mislead were it not observed that this is a purely adventitious and subsequent conformity, and a change from the form originally used The mere form in this respect is not secured by the patents and has no actual bearing or significance in the determination of this case. Changing the form in this respect did not impair the rights of the complainant, nor does a change in that respect constitute any violation of the patent by these defendants.

Place then in the American gas burner a reservoir conical in form with its greater diameter at top, and except in two particulars the defendants' stove is produced with literal exactness; those particulars are these:

1st. The products of combustion in the American gas burner pass through openings in the bell formed top edge of the firepot, and circulate freely along and around the firepot below, whereas in the defendant's present stove that top edge of the firepot is removed, and these products of combustion pass directly over the edge.

2d. The firepot in the American gas burner had perpendicular sides, while in the defendant's last stove the bottom is contracted so that the sides are oblique or sloping.

If these changes were not the adoption of new devices covered by the complainant's patents, this is decisive.

As to the first there is nothing like it in the stove described in their patent. By the change, the space over the edge of the firepot was made perfectly open and free from all obstruction to the even regular and constant overflow of the products of combustion down around and along the sides of the firepot to the base. In the complainant's stove as described in their patent a directly contrary arrangement is introduced, viz: the circular flange connected with the lower part of the magazine is brought down and made to fit upon the upper edge of the fire-pot, not only so that there can be no such overflow, but so as to form a close circular chamber or "flame channel" from which there is no outlet except through what are described as "perforated flanges or ears of said pot" forming outlets leading to the descending pipes on the outside of the pot. Such flame channel compelling (as claimed) the products of combustion to pass horizontally over the surface of the incandescent coal to reach the outlets; and thus, as alleged, producing a more perfect combustion of such products — an arrangement and a result not made or attained in the defendant's stove.

As to the second, viz: The reduction of the diameter of the firepot at the bottom, I have already shown that this was neither new, nor produced any new result. The diameter of the top must, in any base burning stove, have such a relation to the diameter of the mouth of the reservoir or feeder as would permit the passage of air from the grate up through the burning coal and maintain combustion in the firepot, and this would be precisely the same whether the diameter of the pot at the bottom were greater or less; any results of the reduced form were no other in this stove than they were in any stove in which a firepot of that form had been before used, and they were not therefore results of any invention or combination embraced in the complainant's patent.

This concession by the counsel for the complainants was made in a spirit of commendable candor and could not I think, have been reasonably withheld since it was true in fact that the defendants had applied the magazine or reservoir with diminished diameter below the top to the American gas burner in 1857 or 1858, three years before the complainant's patent, and in a modified form afterwards down to the construction of the stove now complained of.

I have not attached importance to this prior use, nor to many other facts which may be deemed material because the views already stated at too much length are decisive.

The defendants are entitled to a decree dismissing the bill with costs.

United States Circuit Court
Northern District of New York, } ss.

I, Augustus A. Boyce, clerk of the said court, do hereby certify that the preceding is a true and correct copy of an opinion of Judge Woodruff, in case of William Hailes, et. al., *vs.* Jasper Van Wormer, et al.

Witness my hand and official seal at my office in Utica this 27th day of June, 1870.

(Seal of the U. S. Circuit Court, Northern District, N. Y.)

AUGUSTUS A. BOYCE,
Clerk.

IN THE

SUPREME COURT

OF THE

UNITED STATES.

125

IN EQUITY.

William Hailes and John G. Treadwell, Administrator of Ellen Treadwell, deceased, Appellants,

against

Jasper Van Wormer, Michael McGarvey, Abraham Mann and Joseph C. Barnes.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT OF NEW YORK.

BRIEF ON THE PART OF APPELLANT

BY E. J. BENNETT.

ALBANY:

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William Hailes and John G. Treadwell, Administrator of Ellen T. Treadwell, deceased, Appellants,
agst.
Jasper Van Wormer, Michael McGarvey, Abraham Mann and Joseph C. Barnes.

Appeal from the Circuit Court of the United States for the Northern District of New York.

This is an appeal from a decree of the Circuit Court of the United States for the Northern District of New York, in the second Circuit, entered on the third Tuesday of January, 1870, dismissing bill of complaints, with costs.

This suit was brought to restrain defendants from infringing the rights of complainants as assignees of said Hailes and John C. Treadwell, secured by two certain letters patent of the United States, granted for improvements on base-burning stoves. One, the patent of May 7, 1861, and re-issued February 3, 1863, and the other August 11, 1863. Also, to recover damages for said infringement. In the patent of 1861, and re-issued February 3, 1863, the claims infringed are Nos. 1, 2, 3, 4 and 5 of said re-issue, and those of the patent of August 11, 1863, are claims first and second.

The said claims of re-issued patent, 1863, are:

First. A base-burning, coal-supply reservoir stove or furnace, so constructed that the products of combustion do not pass up around and above the supply reservoir, but down outside of the fire pot toward the base of the stove, and out through a main draft flue leading directly from a space or chamber about the lower part of the stove.

Second. Contracting the discharge end of the magazine and enlarging the mouth of the fire pot, and extending the flame passages downward into the base of the stove, for united operation in a magazine stove.

Third. Is an imperforated fire pot in a magazine stove, so constructed that an inclosed horizontal chamber for the free expansion and circulation of the flame and gases is formed around and outside the contracted discharge of the magazine and above the upper edge of the fire pot, for united operation.

Fourth. Consists in combining the descending passage or passages with the continuous flame-expansion and circulation chamber, and a main draft flue in the base of the stove leading out of the base of the stove.

Fifth. Consists in an imperforated, trumpet-mouthed fire pot in combination with the downward flame passages for united action.

The said claims in the patent of August 11, 1863, are:

First. Consists in the combination of illumination openings with the flame-expansion chamber formed as above, and the magazine, the fire pot and descending passages.

Second. Is for a branch draft flue and damper in combination with said expansion chamber, descending passages, flues, etc., formed as described.

POINTS.

First. A stove is an apparatus constructed with a view to holding fuel and facilitate the chemical union of the carbon and the gases of the fuel with the oxygen of the air for the purpose of combustion and radiating heat, and in modern times the transmission of light from the incandescent fuel also.

These are the primary objects, and to the attainment of these a combination and arrangement of parts becomes necessary. These combinations are various, though the primary result — that of effecting combustion — is the same.

The difference in the results produced by different combinations is that of degree rather than that of kind, and relates to the economy in the use of fuel in producing a certain degree of heat; and this is made to depend upon the best arrangement and combination of parts to harmonize with the laws of combustion.

Invention is made to depend upon the novelty of the combination and the utility of the results. The person who invents a new and useful combination of old devices, old appliances or old principles, is regarded by the law as much an original inventor as the person who first discovers and applies a new principle in physics.

The history of useful inventions demonstrates that the advanced civilization of the world depends chiefly upon those who have improved upon the discoveries of those who had first applied some new law of physics to practical uses.

Invention leads to refinement, upon refinement, until approximate perfection is attained in art, science or mechanics.

The result is not attained through one mind; this approximate perfection is only attained through the siftings of different minds, each contributing something, and each entitled legally as well as morally to what is justly theirs.

The primary parts forming the combination in complainants' patents for improvements in stoves, by a reservoir with a contracted discharge end in combination with a flaring fire-pot, together forming a space between it and the reservoir and extending around the reservoir a flame or combustion chamber, with a revertible draft, whereby the products of combustion are forced over the edge of the fire-pot down into the base of the stove, so that the products of combustion do not pass up and around the supply reservoir, nor up through the grate, *but down, outside the fire-pot toward the base of the stove, and out through a main draft flue* which leads directly from a space or chamber above the lower part of the stove, together with a damper to regulate the passage of the

products of combustion, in connection with mica lights in the outer casing.

The effect produced by contracting the feed end of the reservoir and expanding the upper edge of the fire pot is to increase the burning surface of the solid fuel. It also has the effect of preventing the coal crowding down too heavily into the fire pot, and increases the capacity of the flame expanding chamber formed above the upper periphery of the fire pot.

The advantage resulting from conducting the products of combustion into the base of the stove, consists in heating the base of the stove and increasing the heating surface through which the products of combustion is forced to travel before they find their outlet through the exit flue. Complainant's evidence, Littlefield, fol. 6, 7.

This combustion of parts co-operate to produce better results as a *whole*, than were before attained in the construction of stoves.

1st. By combining in one stove the advantageous elements of two distinct classes of stoves, viz.: A popular base burning or reservoir stove, in which the supply of fuel is fed by gravitation to the fire in the fire pot, and the surface burning stove having a revertible draft, wherein the products of combustion are carried down into the base and out through the exit flue.

2d. By the combination of a reservoir with a contracted discharge end, and a flaring fire-pot, whereby the combustion chamber is enlarged, thereby producing more perfect combustion of the top coal in the fire pot, as well as the gases evolved.

3d. By this arrangement of fire pot and reservoir, the coal spreads out laterally, forming a conical pile, and burns in layers, decreasing in depth from the center to the outer edge of the fire pot, whereby the air finds a freer passage up through the pile of coal into the combustion chamber, to

there supply the gases with oxygen for their combustion.

4th. By the added combination of mica lights in the casing, light is transmitted from the burning fuel.

This construction of reservoir and fire pot, co-operate to produce the combustion chamber.

The revertible draft co-operates with the extended flue surface in carrying the products of combustion down into the base and giving a larger radiating surface before they are expelled through the exit flue, thereby radiating more heat.

The reservoir and fire-pot co-operate with the revertible draft in producing the continuous supply of the products of combustion that are forced to travel down into the base of the stove and through the extended flue surface, giving more heat the further they are compelled to go.

In short, the several parts perform functions peculiar to themselves, and by the combination and co-operation of these several functions, results as a whole are produced, designated a stove.

These primary parts of complainants' patent, viz.: Reservoir, fire-pot, revertible draft, mica lights and damper, are all parts that may be found separately in different stoves; but in no single stove previously constructed so arranged and combined within the casing of a stove, whereby a revertible draft, base-burning stove was produced — that is a base-burning revertible draft stove, *wherein the products of combustion was prevented from passing up around or over the reservoir.*

Base-burning stoves like defendants' exhibits the Mot, the Nott, the Harper & Walker, the French Walker stove and the stoves made by D. G. Littlefield in the city of Albany, N. Y., were all reservoir stoves, but they were also

direct draft stoves; the products of combustion finding a direct passage out at the exit flue, instead of passing down through the base and then out at the exit flue.

Again, base-burning stoves like defendants' exhibit, the Sexton stove, wherein the products of combustion passed up along and over the top of the reservoir and then down into the base and up side flues to convey heat to apartments above.

But in no base-burning stove, constructed previous to complainants' patents, can there be found such an arrangement and combination of parts as a contracted feed end of reservoirs, in combination with a flaring fire-pot and revertible draft, whereby the products of combustion are prevented from passing up, along and over the reservoir and forced down over the front of the fire-pot into the base of the stove.

Again, you find surface-burning stoves like the exhibit of defendants', the McGregor and the Gas Burner, having a revertible draft; but they are without reservoirs, and therefore are unlike complainants' stove.

Among the various exhibits produced by the defense, none will be found containing the construction and combination of parts claimed as the improvements of complainants.

I omit here any mention of defendants' exhibits Nos. 1, 2, and 3, and will treat of them in a subsequent part of this argument.

There is no principle of patent law better settled than this, that when new combinations of old devices produce new results, or old results in a better way, there is invention.

In the case of *McCormic* v. *Seymore*, NELSON, J., said: "Invention, as respects mechanics, is any new combination of machinery whether of new or old parts or materials producing in its arrangement and construction a useful result."

A combination in a patent is to be regarded as a unit, and if all its essential elements have not before been *embodied and employed together*, is to be taken as an original invention. *Watson* v. *Curney*, 4 Fish. P. C. 148.

Applying these well-established principles defining invention to the complainants' patents, we find that by a new combination of old devices they have invented a new class of stove, a new manufacture; a stove uniting in itself all the advantages of a reservoir stove, and a revertible draft stove, which prevents the products of combustion from passing up around and over the reservoir, thereby heating the fuel in the reservoir to the degree of expelling from the coal the gases, and causing their explosion within the reservoir, as well as their escape therefrom into the apartments. Complainants' ev., fol. 77.

The means here employed to produce an effective and economical stove, differs from all modes heretofore used, and the efficiency and practicability of these means is demonstrated by their adaption and use by these defendants, as well as most of the stove manufacturers of the country. A revertible draft to a base-burning or reservoir stove has become a public necessity, from their great utility, since these complainants' invention.

SECOND. The stoves manufactured by these defendants, and represented by complainant's exhibit "A," infringe the claims Nos. 1, 2, 3, 4 and 5 of re-issued patent dated February 3, 1863, and claims Nos. 1 and 2 of patent dated August 11, 1863.

This is proven by the testimony of Dennis G. Littlefield of Albany, N. Y., an inventor and stove manufacturer for more than thirty years (complainant's ev., fols. 168 to 175) by James Gray, another stove manufacturer of twenty years experience (complainant's ev., fols. 179 to 186); and the

testimony of William Hailes, one of the complainants, as well as the drawings, exhibits B, C and D, page .

The defendants offered no testimony to disprove the statements of these witnesses, that defendants' stove (Ex. "A") embraced the principles of construction and operation set forth in said claims and described in said letters patent. They substantially admit this to be true; nor did these counsel upon the argument, as I am informed, deny but that defendants so made and constructed these said stoves, but rested his defense upon the grounds that the invention was not new and original with the patentee.

And yet, from the published opinion of the honorable judge who presided at the circuit, it appears that the bill was dismissed on the ground that defendants' stove did not embrace in its principles of operation complainants' patented improvements.

With all due deference for the opinions of a judge, for whose ability and learning I have the greatest admiration and respect, I must call the attention of this honorable court to the reasoning upon which this opinion is based. 1st. It should be borne in mind that the principle claimed and embraced in complainants' patent is the combination of a reservoir contracted at the lower end, with a flaring fire-pot, forming a large combustion chamber, together with the passage of the products of combustion down over the top of the fire and into the base, and not up along and over the reservoir. The complainants do not in their specifications limit themselves to any prescribed form of construction. They say (page 20, fol. 49): "We have given a minute description of one practical mode of embodying our invention, but in doing so we have not intended that we should be understood as confining ourselves to the details mentioned, as it is obvious that the invention may be embodied in various ways."

Chief Justice Marshall (see 2 Brock. 310) says mere change of form or proportion in a machine does not change the machine. The change must be functional, producing new results, or develop some new agency that produces better results.

His honor, the judge at the circuit, says in his opinion:

"The complainants' combination is not the simple union of these several devices to produce a new result, but their employment in combination with other devices, producing a stove differing in many respects from the stove of the defendants." (Opinion.) Referring to the perforated case and to the downward flues of complainants, as shown in drawings attached to complainants' patents, exhibits B and C, forming a part of the hot-air chamber when the other castings are applied, he said: "There is no such extension flues for the downward draft in defendants' stove," etc. (Opinion.)

Is this difference any thing more than a difference in mechanical construction? Is it any thing more than that difference between the means likely to be employed by two distinct minds in applying a principle described to practical use? Are there any new or different results produced by the defendants' method of construction and the complainants'? The combustion chamber is there all the same, formed by the contracted end of the reservoir and the enlarged top of the fire pot, whether you have the circular flange surrounding the feed end of the reservoir as shown in the drawings attached to re-issued letters-patent of February, 1863, or the modified construction as shown in the patent of August 11, 1863, or as appear in the construction of defendants' stove, exhibit A.

Are there any new or different results produced by the products of combustion passing over the fire-pot down between it and the outer wall and the inner wall of the stove, and so into the base as shown in defendants' stove, or where they pass down through one or more flues as separated and distinct passages down into the base? Is this difference any thing more than a difference in mechanical construction in carrying out a principle of operation? The complainants are not confined by their patent to any specific form of construction; they claim the construction of any means that legitimately represents their principles and carries into practical operation the functional parts that make up the whole (fol. 49).

Again, whether the space around the top of the fire-pot is closely inclosed or not, cannot affect the action of the combustion chamber; the same space is there with or with-

out the inclosed ring, as the products of combustion in neither case can rise any higher in the stove than enough to pass them over the top of the fire-pot and down into the base; substantially the same results are obtained by substantially the same means; the one is the mechanical equivalent for the other.

The feature in defendants' stove of the "reservoir having no connection with the fire-pot, nor with the sides of the stove," communication with the upper part of the stove around the way is not cut off by flanges, or otherwise" (opinion), does not change the operations of the stove as a revertible draft stove; for, when it is such a stove, none of the products of combustion can pass up along the space.

They are forced to pass down into the base, the same as in a stove constructed after said drawings attached to exhibit "B." The same amount of heat will be radiated along the space between the reservoir and the outer casing in both stoves.

The combustion chamber, in a stove constructed as defendants, does not "consist of the entire space over the fire-pot, and *that space not occupied by the reservoir* between it and the outer casing" (opinion).

In a revertible draft stove, the space wherein the combustion of the gases takes place is directly over the incandescent coals. *That space* (and none other) formed by the contracted end of the reservoir and the extended or expanded top of the fire pot. This is the same in both stoves, and cannot be otherwise, as the draft forces the gases and flames down over the top of the fire pot and into the base.

"The ring flange K, and the detaching ring (v), with horizontal flange and bolts to form in their connection a frame for the reception of fire brick or other fire-proof material." This is a mere mechanical contrivance, and no part of the invention of the complainants, effecting the principle of operation of his stove. The results would be the same if any other mechanical equivalent was employed, or if none was used at all, as in defendants' stove.

The result, if any, produced by the use of the fire brick, is one independent of the combination of its functional parts, as a reservoir, revertible draft stove, and if defendants

have not used it, then, as matter of course, they have not infringed that claim.

Again, said opinion reads, referring to complainants' improvements: "However valuable, and whether they do or do not produce a new result, the defendants have not used them.

"They employ the mean iron cylinder as a receptacle and conductor of the coal to the fire-pot without any such protection" (the arrangement of fire brick attached to the feed end of the reservoir).

Has the attachment of this fire brick to the feed end of the reservoir any thing to do with the fundamental idea of constructing a reservoir stove with a revertible draft? Is the harmonious action of the functional parts essential to the attainment of this end at all affected, whether the feed end of the reservoir is protected by fire brick or not?

Certainly not; for you find the same results produced by a reservoir stove with revertible draft in defendants' stove when the reservoir is all iron.

If there is any new and useful result flowing from the use of fire brick complainants were entitled to a separate patent for the same; and the law allows them to include this claim as a separate invention in the same patent that embraces their other improvements, and they have done so without at all impairing the others; and these defendants are liable as infringers, so far as they have infringed our several claims, and no farther.

Again, said opinion reads: "Bringing thus into view the fact that the complainants' patents are not for the mere combination of a reservoir diminished in size at its outlet, with a flaring fire-pot and revertible flues and mica windows, *but that these are used in combination with other devices.* I observe that, whatever new results are produced, they are due not to the combination of the first named four devices (*which alone appear in defendants' stove*), but to those other devices which are used in combination therewith.

This view of complainants' patent entirely ignores the principles upon which their stove is constructed, and decides the question of infringement upon the adjuncts and attach-

ments which only relate to the mechanical construction in embodying the principle. It virtually decides the question upon form instead of substance.

The opinion here admits that the court finds in defendants' stove the combination of "a *reservoir diminished in size at its outlet, with a flaring fire-pot and revertible flues and mica windows.*" These, and these alone, are the functional parts, which constitute that *whole* which is a reservoir stove with a revertible draft that prevents the products of combustion from passing up along and over the reservoir. All else are mere adjuncts which may or may not be applied, with or without advantage, but in no way affecting the functional and legitimate co-operation of their fundamental parts.

If this view of complainants' patent is correct, then the opinion of the honorable judge in this case clearly sustains the infringement of these defendants.

Again, in the same opinion, it is written: "Some attention to the difference between mere aggregation of devices and their results on the one hand, and a patentable combination of old devices, which produce a new result in a better or more economical manner."

"The mere addition of an old device, producing a given result to another old device, producing its own result, in such wise that their combination produces those same two results, and none other, is not invention," which is ~~most~~ true.

This is followed by an illustration, by taking a fire-pot lined with brick, useful on account of its indestructibility, and in common use; then a stove with revertible draft, whereby increased heat is produced, also in common use; and combine with these a reservoir in common use, all in one stove. These several parts, each performing their separate functions, these separate results would not be due to the combination. But then follows the statement: "*Nor would any result be produced that either separately did not produce.*"

This is equivalent to denying that two distinct forces acting together could not produce any result that either separately could not produce. That though one man might lift an hundred pounds, two men could lift no more. That

though one volume of oxygen combines with one of carbon, forming carbonic oxide, two volumes of oxygen could not produce carbonic acid.

This would be striking at the root of all invention, and even dethrone nature, for she exists only by the coaction of distinct forces.

The combination of parts in complainants' patent, though performing the functions peculiar to each, when their action is combined produce results as a whole different from the results produced by the separate action of each, and which could not be produced by any *one* separately. To illustrate: Assuming that the purpose is to construct a stove that will radiate more heat and light from a given amount of fuel, and also to produce more perfect combustion especially of the gases evolved from the burning fuel, also to prevent the products of combustion from passing up, along and over the reservoir, to obviate certain objectional results from such passage.

Now, will the fire-pot accomplish these results alone? Will the reservoir? Will the mica lights? Will the revertible draft? If not separately, will they when their separate action is combined? If so, then they co-operate to produce a result or results not due to the separate action of the several parts, contributing each its proper function to make up that *whole*—such a stove; and this is either the production of a new result or a better result.

Again: the opinion informs us that the honorable judge, "in arriving at his conclusion, made use of the stove described in the complainants' specification, and exhibited in the drawings," and not the stove called the Brilliant, which he conceives departs largely therefrom. But the Brilliant is described in the claims as the other mode of construction, and a mechanic left to construct a stove from the claims here set forth, as infringed by these defendants, would be quite as likely to construct such a stove as one represented by said drawings. The mode and manner of embodying the principle would depend entirely upon the skill and ability of the constructor; and however it might differ in form and construction of parts, if the same results were produced, and none other, it would, in the view of the patent law, be the same in structure.

Third. It is not denied, but admitted, that defendants' stove produces substantially the same results that are produced by complainants', and by the use of substantially the same means by a reservoir stove, having a downward draft into the base, forcing the products of combustion down instead of up and around the reservoir and mica lights.

The means employed to produce this are the same in each. 1st. A contracted reservoir and flaring fire-pot, together forming an extended combustion chamber directly over the incandescent fuel where the gases are burned.

2. The formation of a conical pile of coal by means of this construction of reservoir and fire-pot, whereby the air finds more ready access to the gases through the unequal depth of coal from the center of the pile to its outer edge.

3. A downward draft.

4. Mica lights producing illumination, and a damper.

The construction of these several parts may differ in form and dimensions, while their functional operation remains the same.

In defendants' stove the reservoir differs slightly in form from complainants', yet it retains the functional form at the lower end, which co-operates with the flaring top of the fire-pot to form the enlarged combustion chamber directly over the fuel. Therefore, the fire-pot and reservoir in both co-operate alike, producing the same results, and none other. The same with the revertible draft and mica lights in each; and these results are in no way affected, either by the ring represented in drawings attached to patents, or the absence of such ring, as represented by defendants' stove. As the *ring does not* produce the combustion chamber, but, on the contrary, that chamber is produced by the co-operation of reservoir and fire-pot; and it is not shown that any results are produced by the ring not produced without it. The combustion chamber cannot, with or without the rim at the base of the reservoir, be enlarged or diminished beyond what is produced by the co-operation of reservoir and fire-pot, as the downward draft passes the products of combustion not up, but down over the fire-pot into the base.

Again, defendants' fire-pot is without the flues attached as shown in complainants' patent, whereby the products of

combustion find a passage-way into the base. In defendants' stove the passage-way is formed by the outer surface of the fire-pot, and the inner surface of the casing of the stove. Is this construction any less a passage-way? Are there any new or better results produced by this change of form? Are not the functional operations of both passage-ways the same? Are they not identical in their principles of operation, bearing the same relation to the other parts of the stove, *i. e.*, serving as channel-ways to conduct the product of combustion into the base, and totally inactive agents for any other purpose.

When in two devises the end to be accomplished is the same, and the means employed the same, the two devises are necessarily the same.

Gray v. Jones, Pet. C. C. 394, 397. Justice Washington.

If the invention of the patentee be a machine, it will be infringed by a machine which incorporates in its structure and operation the substance of the invention—that is by an arrangement of mechanism which performs the service, or produces the same effect in the same way, or substantially the same way.

Wyeth v. Stone, 1 Story, 273.

One machine is the same in substance as another if the principle be the same, though the form of the machine be different.

Bovel v. Moore, Dav. P. C. 361, 415.

When the same general plan is applied for the same purpose, although the mode of construction may be varied, it will still be substantially, in the eye of the patent law, the same.

McConne v. Seymore, 2 Blatchf. 378. Judge Nelson.
Blanchard v. Bennes, 2 Blatchf. 418.
How v. Morton, and How v. Williams, M. S. Judge Sprague.

If a party adopt a different mode of carrying the same principle into operation, and the principle

admits a variety of form, there is an identity of principle, though not an identity of mode.

Page v. Terry, 1 Fish, 310.
Hoffman v. Aronson, 8 Blatchf. 324 (paper collars.)
Curtis on Pat., §§ 42–49.

Fourth. The defendants have introduced a number of stoves constructed previous to the date of complainants' patents, to prove complainants' patent is not a new and original invention. These stoves illustrate the state of the art at different periods, showing the various stages of improvements through which heating stoves have passed before human ingenuity devised those relatively perfect structures that now so greatly contribute to the health and comfort of a people living in a rigorous climate, such as prevails through half of the year in some of the States.

No class of inventors are more entitled to the gratitude of a people, than those who have by the application of their inventive faculties so improved the heating qualities of stoves, as well as their economy in the consumption of fuel, whereby our dwellings are made as cheerful and comfortable amid the rigors of an almost polaris winter, as the dwellers among the tropics, prolonging the average of existence and facilitating the raising of children with more perfect constitutions.

Shall these public benefactors be robbed of their rights of property in their inventions secured to them by law, because stoves have been constructed containing some of the elements or parts that may be found in their construction, when the structure, as a whole, in its principles of operation, is radically different.

Air, light and water are free to all, so are the mechanical devices that have become public property, but cannot an inventor use those elements in a new combination and form, producing new or better results, as well as he may use the elements of nature to the same end, and still be an inventor.

Nature herself works in this wise. She allows nothing to go to destruction, but is incessantly re-combining old atoms and forming new bodies.

So with the inventions claimed in these patents of com-

plainants. They have taken old devices and re-arranged and re-created them into functional parts, co-operating together to produce new or better results; and until these defendants and all other defendants can produce a stove combining all the functional parts contained in complainants', they cannot invalidate their patent.

Have these defendants done this?

First. There is their exhibit No. ——. The French Walker stove. Where in this stove do you find the revertible draft into the base or the contracted feed end of the reservoir? It is a reservoir stove it is true, and the products of combustion pass up and around the reservoir. Fig. 12. In figure 16, they pass up along the reservoir and over the lining between the reservoir and the outer wall of the stove. The top of this lining extends a comparatively great distance above the fire-pot. The products of combustion are then carried, not down into the base of the stove, but off into an attachment to the stove containing an oven to then circulate around through flues.

This stove does not embrace the combination claimed by complainants. Its principles of construction and operation are radically different.

The purposes to be accomplished in the construction of figure 16 was that of a reservoir stove, to convey heat by means of flue passages to an attachment containing an oven for culinary purposes.

The next exhibit is the Harper & Walker stove, No. ——.

Where in this stove do you find a revertible draft and a contracted discharge end of the reservoir? You find a reservoir and flues extending up parallel with the reservoir — the very opposite of complainants' construction. Where do you find the flaring top fire-pot, as figures 1 and 2 of said stove represent?

This stove does not contain the combination of parts and cannot produce the results produced by complainants'. It is a totally different structure, embracing radically different principles of operation.

Next is the McGregor stove. Where do you find in this stove a reservoir? Where the flaring fire-pot? The draw-

ings would seem to indicate a passage into the base of the stove.

Will it be contended that this representation anticipates these complainants' patents?

Then comes the S. B. Sexton stove, No. —. This diagram represents what is known as a fire-place heater, or Baltimore heater, by which title it is best known.

This stove has a reservoir suspended high above a broad and square fire-pot, as large at the base as at the top.

The products of combustion pass up and along and over the reservoir, and then near the top of the stove pass out into flues and down one side of the stove and under the base, and then up a corresponding flue on the other side to an exit flue.

The purpose and object of this construction is to convey heat to apartments above.

Its principles of construction and operation are radically different from complainants' stove.

Where, in this construction, do you find the products of combustion prevented from passing up, along and over the reservoir, and passed down over the rim of the fire-pot? Where do you find the contracted feed end of the reservoir and the enlarged top of a fire-pot, forming thereby a combustion chamber, restricted to this space alone?

Next comes the J. C. Henderson stove, exhibit No. . This is one among the many abortive efforts to improve heating stoves, impracticable, born and dying in the same breath. Where in this stove are to be found the combinations of complainants?

Then comes the Nott stove. This stove is to be honored for the memory of its distinguished inventor. But where in its construction will you find the idea embodied that shows forth in complainants' stoves? There is no revertible draft into the base. Its construction of fire-pot and reservoir embodies an entirely different idea, and a combination for a definite purpose. The lower end of the reservoir is not contracted. The passage of the products of combustion over the top of the fire-pot and round a partition in the side of the stove, suggested an entirely different idea of plan and operation from that of carrying the products of combustion

down into the base underneath the fire-pot for the purpose of increasing the heat at the base of the stove. The flue arrangements in this stove were constructed with a view of increasing the radiating surface of the stove, without regard either to throwing the heat into the base and near the floor of apartments, or to prevent the products of combustion from passing up along the reservoir.

This stove cannot be said to embrace the principles of construction and operation, nor to embrace the combinations set forth and claimed in complainants' patents.

Then there is the Mot stove, exhibit No. . It is apparent at once that the principles of construction and operation of this stove is totally unlike complainants', and that it does not embrace the combinations set forth and claimed in complainants' patents.

Next is the Littlefield stove, exhibit 19. This stove is as unlike complainants' in principle and operation as the former. It has no revertible draft, but, on the contrary, like the Mot stove, the products of combustion pass upward and not down into the base.

In view of these exhibits complainants' stove must be considered a new and useful invention, when the decisions of the courts are considered.

> Things are substantially different when they perform functions; or in a different way produce new results or old results in a better way.
>
> Smith, Ex parte, MS., App. Cas. 1860.

> If the same results are produced by means different in principle and operation, then the two things are different.
>
> Whitmore v. Cutler, 1 Gall. 80, Story, J.

> To constitute prior invention the same effects must be produced by substantially the same combination of forces.
>
> Welsh, Ex parte, MS., App. Cas., 1857.

Proofs that parts of a combination were before known amounts to nothing.

Although all the parts going to constitute the plaintiffs' invention — a car-wheel — may have been known before and developed in prior wheels, if the patentee first brought them together into a whole, and that whole is materially different from any whole that existed before, he is the original and first inventor, and entitled to a patent.

Murry v. Sizer, 1 Fish, 21.
Blake v. Stafford, 6 Blatchf. 205.

If the difference between two machines is not a mere difference of form; if there is a material alteration of structure; if they are substantially different combinations of mechanism, to effect the same purpose by means that are not really the same, then they are different.

Curtis on Pat., § 309.

Any change in the instrument employed, by which a new result is produced, or an old result produced in a more economical or beneficial way, is the subject of invention.

Earls v. Lawyer, 7 Mass. 1.
Sard v. Brown, 1 Woodb. & M. 53.
Russell v. Carley, Web. Pat. Cas. 464.
Foot v. Silsby, 2 Blatchf. 260.
Buck v. Herman, 1 Blatchf. 398.

Fifth. There still remains among the exhibits of the defendants in this case the stove manufactured by them in 1857–8, known as the American Gas Burner, and the exhibits Nos. 1, 2 and 3, which they claim represent experiments made by them in the American Gas Burner in the winter of 1857–8.

This American Gas Burner shows a deep, straight fire-pot, surrounded by a perforated flange, with an air tube passing up from the base through the fire-pot to its top. The products of combustion pass down around the fire-pot into the base, and up to and out through the exit flue. This stove had no reservoir, and, consequently, did not embrace the principles of construction and operation contained in complainants' patents, and, therefore, cannot be considered as anticipating it.

To cure this defect these defendants have introduced exhibit No. 1, which shows a tube extending from the top of the stove *five and a half inches into the fire-pot;* and this tube, as the evidence shows, was constructed of sheet-iron (fol. 93, page 37). Such was its position when these defendants commenced experimenting with it (fol. 116, page 46, Van Wormer).

The evidence with reference to the existence of Nos. 1 and 2, it is worthy of remark, is confined to the testimony of these defendants, Van Wormer, McGarvey and Barns. It is always more satisfactory, in a case of this kind, that the evidence of what the defendants may have constructed, that was not publicly known and offered for sale, bearing upon the question of infringement, should come from disinterested witnesses.

I remember a case where such models were constructed by the defense during the taking of testimony on the case, that never had any existence before, and were sworn to as representing stoves made and sold before the date of complainants' patent.

At best, this kind of evidence should be received with the greatest caution, especially at such a period of lax morals as the present. A lack of conscience seems to be epidemic in these times.

Upon the testimony of these defendants it is made to appear that, in the winter of 1857 and 1858, they experimented with the American Gas Burner by inserting a sheet-iron tube, which extended down into the fire-pot 5½ inches. That it was used in that way several weeks as a reservoir stove and worked well. This is to assert that a thin piece of metal in the form of a cylinder would stand the intense heat produced by combustion, while resting right down upon a body of incandescent fuel, and surrounded by the combustion of the gases evolved, which, in the case of carburetted hydrogen, produces the most intense heat, 1,000 degrees or more. This is to declare physical laws false and more immaculate. If such a piece of metal could resist such heat for five minutes, it would be a real miracle, for it would involve a suspension of the laws of nature.

But does this childish construction, if it ever existed, embody any principle of practical operation? Does it not — with all its arrows pointing up and pointing down, as here we go and there we go — represent that embodiment of principle and design, the adaptation of ends to means, shown in complainants' patents? Has it any characteristic features of a well-digested system of operation? They say they abandoned it; that they never made a stove like it for use or sale, but that, in the autumn of 1861, they constructed the apparatus represented by exhibit No. 2.

This exhibit does not differ essentially from No. 1. It had a sheet-iron tube representing a reservoir, the mouth of which extended down into the fire-pot. The same can be said of this exhibit that was said of exhibit No. 1. If, as they testify, they used it in their office in 1861 and 1862, with these sheet-iron tubes serving the purpose of a reservoir, they must have been the daily witnesses of a miracle. This construction was also abandoned by them. None were ever made for sale; but in 1864 and 1865, after complainants' patents of 1861 were granted, they constructed exhibit No. 3. This exhibit fairly represents an organization and adaptation of means to an end. The reservoir in this stove was not constructed of sheet-iron. This stove had dimension, form and construction.

It was not so difficult for them to construct a practical reservoir and revertible draft stove after they had seen complainants' stove. They did not place this stove in the loft among the rubbish only to be brought forth in such a case as this, but they proceeded to construct stoves for the market embodying its principles of construction.

Contrast the manner of procedure of these two parties — the complainants and the defendants — in obtaining a revertible draft reservoir stove for the trade.

The defendants take a stove they were making and selling, and put into it a sheet-iron pipe, and then content themselves with talking about making a revertible draft reservoir stove, and occasionally making chalk marks upon the floor, representing their imaginary reservoir, from 1857 to 1864 (fol. 93).

From 1857 to 1861 these complainants were steadily

experimenting and laboring to bring together into successful operation within, one stove the most popular elements of two distinct classes of stoves. The reservoir or base-burning stove and the revertible draft stove.

In 1861 they obtained their patent. They constructed a stove embodying the principles of operation set forth in their patents, exhibits B and C. But, in the construction of the mechanical parts to work out their idea, they found certain defects that only experience could cure. The chief result was achieved, that of producing a stove in which these two features would be combined and co-operate together, but it lacked that perfection of operation they felt themselves capable of producing by a more careful attention to the construction of details. In February, 1863, and again in August, 1863, they received patents for additional improvements. The principles of the stove remained unchanged; the details of construction, with some minor adjuncts, were added. Thus, step by step, they labored and toiled to produce a perfect stove with reservoir and revertible draft, until the object is accomplished, only to have these defendants, who all this while had been playing at stove-making with reservoir and downward draft, drawing chalk representations on their floor of what they were going to do, step in and pirate their invention, robbing these complainants of their right of property in that which their labor and skill had created, adopting bodily the principle, only omitting to copy those forms and adjuncts that were no part of the principle of construction and operation.

Granting that these exhibits of defendants represent a stove similar to complainants', were they practical working machines? Were they not abandoned, and was there any reasonable effort made by them to perfect these stoves during several years? Was there any intention manifested on their part in sticking a sheet-iron tube into the gas-burner, and chalking the outline of the reservoir on the floor?

Will they be considered a prior invention, embodied in a practical form, and tested by use, to the extent of depriving a subsequent patentee of a perfect apparatus, performing all the operations for which it was designed in a most perfect way, thereby creating a new class of stoves, a new article to

consumers, a new manufacture, and thus deprive a public benefactor of the advantages of his discovery and invention?

To constitute prior invention the principle must be embodied into a working machine and adapted to practical use.

Sickles v. Borden, 3 Blatchf. 538.

An experiment as to the products of a machine which was unsatisfactory and had been abandoned, is not such an invention as entitles a person to the benefit of the patent laws; and such abandonment seems an impediment in the way of all future inventors who may follow in the same line.

Wormer v. Danforth, MS., Nelson, J., 1860.

The idea or suggestion of an application of a principle to produce an effect is not sufficient to entitle a party to a patent, but the one who first reduced the idea to practical application and use is entitled to a patent.

Fort v. Sibly, 1 Blatchf. 464, Nelson, J.; McConnie v. Seymore, MS., Nelson, J.; Goodyear v. Ray, 2 Wall. 227; Parkhurst v. Kinsman, 1 Blatchf. 495, and cases there cited.

E. J. BENNETT,
Counsel for Appellants.